Third National Health and Nutrition Examination Survey
(NHANES III), 1988-94

NHANES III SECOND LABORATORY DATA FILE DOCUMENTATION

Series 11, No. 2A

April 1998

Table of Contents

Introduction

The National Center for Health Statistics (NCHS) of the Centers for Disease Control and Prevention (CDC) collects, analyzes, and disseminates data on the health status of U.S. residents. The results of surveys, analyses, and studies are made known through a number of data release mechanisms including publications, mainframe computer data files, CD-ROMs (Search and Retrieval Software, Statistical Export and Tabulation System (SETS)), and the Internet.

The National Health and Nutrition Examination Survey (NHANES) is a periodic survey conducted by NCHS. The third National Health and Nutrition Examination Survey (NHANES III), conducted from 1988 through 1994, was the seventh in a series of these surveys based on a complex, multi-stage sample plan. It was designed to provide national estimates of the health and nutritional status of the United States' civilian, noninstitutionalized population aged two months and older.

The following table summarizes the NHANES III data which are currently
available on CD-ROM, including this release.

Table 1. Available NHANES III CD-ROMs

CD-ROM Name	Release Date	Size in Megabytes	Data Files / Description
NHANES III, 1988-94, Series 11, No. 2A, ASCII Version (this release)	April 1998	407	Dietary recall (replacement), electrocardiography, laboratory (additional analytes), and vitamins/medicines data files and documentation
NHANES III, 1988-94, Series 11, No. 1, Revised SETS Version 1.22a	October 1997	285	Adult and youth household questionnaire, examination, and laboratory data files and documentation, plan and operation, analytic and reporting guidelines, weighting and estimation methodology, field operations, non-response bias
NHANES III, 1988-94, Series 11, No. 1A, ASCII Version	July 1997	454	Adult and youth household questionnaire, dietary recall, examination, and laboratory data files and documentation
NHANES III, 1988-94, Series 11, No. 1, SETS Version 1.22a *	July 1997	285	Adult and youth household questionnaire, examination, and laboratory data files and documentation
NHANES III Reference Manuals and Reports October 1996	October 1996	152	Plan and operation, analytic and reporting guidelines, weighting and estimation methodology, field operations, non-response bias

*   Do not use this CD-ROM It had technical problems and has been
     superseded by the revised SETS version 1.22a, Series 11, No. 1,
     released in October 1997.

This release, Series 11, No. 2A, contains previously unreleased data and
corrections. Corrections were made to the vitamin/minerals portion of the
adult and youth questionnaire data files as well as the dietary recall portion
of the examination data file. For the laboratory component, some previously
release variables have been augmented with NHANES III Phase 2 data. In
addition several new laboratory variables have been added.

The following table shows which public use files contain information from the
interview and examination components.

Table 2. Location of the interview and examination components in the
NHANES III public use data files

                                          Data File

Topic	HA	HY	EXAM	LAB	DIET	VMS	ECG
Sample weights	X	X	X	X	.	.	X
Age/race/sex	X	X	X	X	.	.	X
Ethnic background	X	X	.	.	.	.	.
Household composition	X	X	.	.	.	.	.
Individual characteristics	X	X	.	.	.	.	.
Health insurance	X	X	.	.	.	.	.
Family background	X	X	.	.	.	.	.
Occupation of family head	X	X	.	.	.	.	.
Housing characteristics	X	X	.	.	.	.	.
Family characteristics	X	X	.	.	.	.	.
Orientation	X	X	.	.	.	.	.
Health services	X	X	.	.	.	.	.
Selected health conditions	X	X	X	.	.	.	.
Diabetes questions	X	.	.	.	.	.	.
High blood pressure and cholesterol questions	X	.	.	.	.	.	.
Cardiovascular disease questions	X	.	.	.	.	.	.
Musculoskeletal conditions	X	.	.	.	.	.	.
Physical functioning questions	X	.	.	.	.	.	.
Gallbladder disease questions	X	.	.	.	.	.	.

Table 2. (continued) Location of the interview and examination components in the NHANES III public use data files

Data File

Topic	HA	HY	EXAM	LAB	DIET	VMS	ECG
Kidney conditions	X	.	.	.	.	.	.
Respiratory and allergy questions	X	X	.	.	.	.	.
Diet questions	X	.	.	.	.	.	.
Food frequency	X	.	X	.	.	.	.
Vision questions	X	X	.	.	.	.	.
Hearing questions	X	X	.	.	.	.	.
Dental care and status	X	X	.	.	.	.	.
Tobacco	X	.	X	.	.	.	.
Occupation	X	.	.	.	.	.	.
Language usage	X	X	.	.	.	.	.
Exercise	X	.	.	.	.	.	.
Social support/residence	X	.	.	.	.	.	.
Vitamin/mineral/medicine usage	X	X	X	.	.	.	.
Blood pressure measurement	X	.	X	.	.	.	.
Birth	.	X	X	.	.	.	.
Infant feeding practices/diet	.	X	.	.	.	.	.
Motor and social development	.	X	.	.	.	.	.
Functional impairment	X	X	.	.	.	.	.
School attendance	.	X	.	.	.	.	.
Cognitive function	.	X	X	.	.	.	.

Table 2. (continued) Location of the interview and examination components in the NHANES III public use data files

Data File

Topic	HA	HY	EXAM	LAB	DIET	VMS	ECG
Alcohol and drug use	.	.	X	.	.	.	.
Reproductive health	.	.	X	.	.	.	.
Diagnostic interview schedule	.	.	X	.	.	.	.
Activity	.	.	X	.	.	.	.
Physician's examination	.	.	X	.	.	.	.
Height and weight	.	.	X	.	.	.	.
Body measurements	.	.	X	.	.	.	.
Dental examination	.	.	X	.	.	.	.
Allergy skin test	.	.	X	.	.	.	.
Audiometry	.	.	X	.	.	.	.
Tympanometry	.	.	X	.	.	.	.
WISC and WRAT	.	.	X	.	.	.	.
Spirometry	.	.	X	.	.	.	.
Bone densitometry	.	.	X	.	.	.	.
Gallbladder ultrasonography	.	.	X	.	.	.	.
Central nervous system function evaluation	.	.	X	.	.	.	.
Fundus photography	.	.	X	.	.	.	.
Physical function evaluation	.	.	X	.	.	.	.
Fasting questions	.	.	.	X	.	.	.

Table 2. (continued) Location of the interview and examination components in the NHANES III public use data files

Data File

Topic	HA	HY	EXAM	LAB	DIET	VMS	ECG
Laboratory tests on blood and urine	.	.	.	X	.	.	.
Total nutrient intakes	.	.	X	.	.	.	.
Individual foods	.	.	.	.	X	.	.
Combination foods	.	.	.	.	X	.	.
Ingredients	.	.	.	.	X	.	.
Prescription Medicines	X	X	.	.	.	X	.
Vitamins and Minerals	X	X	.	.	.	X	.
Electrocardiography	.	.	.	.	.	.	X

Data File Definitions

HA   - Household Adult Data File
HY   - Household Youth Data File
EXAM - Examination Data File
LAB - Laboratory Data File and Second Laboratory Data File
DIET - Dietary Recall Data Files
VMS - Vitamin Mineral Supplement Data File
ECG - Electrocardiography Data File

This document includes the documentation for the NHANES III Second Laboratory Data File and also contains a general overview of the survey and the use of the data files. The general overview includes five sections. The first section, entitled "Guidelines for Data Users," contains important information about the use of the data files. The second section, "Survey Description," is a brief overview of the survey plan and operation. The third section, "Sample Design and Analysis Guidelines," describes some technical aspects of the sampling plan and discusses some analytic issues particularly related to the use of data from complex sample surveys. The "Data Preparation and Processing Procedures" section describes the editing conventions and the codes used to represent the data. The last and fifth section, "General References," includes a reference list for the survey overview sections of the document.

Public Use Data Files for the third National Health and Nutrition
Examination Survey will also be available from the National Technical
Information Service (NTIS). A list of NCHS public use data tapes available
for purchase from NTIS may be obtained from the Data Dissemination Branch at
NCHS. Information regarding a bibliography (on disk) of journal articles
citing data from all the NHANES and the availability of NHANES III data in
CD-ROM/SETS software format can be obtained from the Data Dissemination
Branch at:

Data Dissemination Branch
National Center for Health Statistics
Room 1018
6525 Belcrest Road
Hyattsville, Maryland 20782

Phone: (301)436-8500

URL:http://www.cdc.gov/nchswww

NTIS can be contacted at:

NTIS - Computer Products Office
5285 Port Royal Road
Springfield, Virginia 22161
(703) 487-4807

Copies of all NHANES III questionnaires and data collection forms are
included in the Plan and Operation of the Third National Health and
Nutrition Examination Survey, 1988-94 (NCHS, 1994; U.S. DHHS, 1996). This
publication, along with detailed information on NHANES procedures,
interviewing, data collection, quality control techniques, survey design,
nonresponse, and sample weighting can be found on the NHANES III Reference
Manuals and Reports CD-ROM (U.S. DHHS, 1996). Information on how to order
this CD-ROM is also available from the Data Dissemination Branch at NCHS at
the address and telephone number given above.

GUIDELINES FOR DATA USERS

Please refer to the following important information before analyzing data.

NHANES III Background Documents

o   The Plan and Operation of the Third National Health and Nutrition
     Examination Survey, 1988-94, (NCHS, 1994; U.S. DHHS, 1996) provides an
     overview of the survey and includes copies of the survey forms.

o   The sample design, nonresponse, and analytic guidelines documents on
     the NHANES III Reference Manuals and Reports CD-ROM (U.S. DHHS, 1996)
     discuss the reasons that sample weights and the complex survey design
     should be taken into account when conducting any analysis.

o   Instruction manuals, laboratory procedures, and other NHANES III
     reference manuals on the NHANES III Reference Manuals and Reports
     CD-ROM(U.S. DHHS, 1996) are also available for further information on
     the details of the survey.

Analytic Data Set Preparation

o   Most NHANES III survey design and demographic variables are found only
     on the Adult and Youth Household Data Files available on the first
     release. In preparing a data set for analysis, other data files must
     be merged with either or both of these files to obtain many important
     analytic variables.

o   All of the NHANES III public use data files are linked with the common
     survey participant identification number (SEQN). Merging information
     from multiple NHANES III data files using this variable ensures that
     the appropriate information for each survey participant is linked
     correctly.

o   NHANES III public use data files do not have the same number of
     records on each file. The Household Questionnaire Files (divided into
     two files, Adult and Youth) contain more records than the Examination
     Data File because not everyone who was interviewed completed the
     examination. The Laboratory Data File contains data only for persons
     aged one year and older. The Individual Foods Data File based on the
     dietary recall has multiple records for each person rather than the one
     record per sample person contained in the other data files.

o   For each data file, SAS program code with standard variable names and
     labels is provided as separate text files on the CD-ROM that contains
     the data files. This SAS program code can be used to create a SAS
     data set from the data file.

o   Modifications were made to items in the questionnaires, laboratory,
     and examination components over the course of the survey; as a result,
     data may not be available for certain variables for the full six years.
     In addition, variables may differ by phase since some changes were
     implemented between phases. Users are encouraged to read the Notes

sections of this document carefully for information about changes.

o   Extremely high and low values have been verified whenever possible,
     and numerous consistency checks have been performed. Nonetheless, users
     should examine the range and frequency of values before analyzing
     data.

o   Some data were not ready for release at the time of this publication
     due to continued processing of the data or analysis of laboratory
     specimens. A listing of those data are available in the general
     information section of each data file.

o   Confidential and administrative data are not being released to the
     public. Additionally, some variables have been recoded to help
     protect the confidentiality of the survey participants. For example,
     all age-related variables were recoded to 90+ years for persons who were
     90 years of age and older.

o   Some variable names may differ from those used in the Phase 1 NHANES
     III Provisional Data Release and some variables included in the Phase 1
     provisional release may not appear on these files.

o   Although the data files have been edited carefully, errors may be
     detected. Please notify NCHS staff (301-436-8500) of any errors in
     the data file or the documentation.

Analytic Considerations

o   NHANES III (1988-94) was designed so that the survey's first three
     years, 1988-91, its last three years, 1991-94, and the entire six
     years were national probability samples. Analysts are encouraged to use
     all six years of survey results.

o   Sample weights are available for analyzing NHANES III data. One of
     the following three sample weights will be appropriate for nearly all
     analyses: interviewed sample final weight (WTPFQX6), examined sample
     final weight (WTPFEX6), and mobile examination center (MEC)- and
     home-examined sample final weight (WTPFHX6). Choosing which of these
     sample weights to use in any analysis depends on the variables being
     used. A good rule of thumb is to use "the least common denominator"
     approach. In this approach, the user checks the variables of
     interest. The variable that was collected on the smallest number of
     persons is the "least common denominator," and the sample weight that
     applies to that variable is the appropriate one to use for that
     analysis. For more detailed information, see the Analytic and Reporting
     Guidelines for NHANES III (U.S. DHHS, 1996).

Referencing or Citing NHANES III Data

o   In publications, please acknowledge NCHS as the original data source.
     For instance, the reference for the NHANES III Laboratory Data File
     On this CD-ROM is:

     U.S. Department of Health and Human Services (DHHS). National Center

for Health Statistics. Third National Health and Nutrition
Examination Survey, 1988-1994, NHANES III Second Laboratory Data File
(CD-ROM, Series 11, No. 2A). Hyattsville, MD.: Centers for Disease
Control and Prevention, 1998.

o   Please place the acronym "NHANES III" in the titles or abstracts of
     journal articles and other publications in order to facilitate the
     retrieval of such materials in bibliographic searches.

SURVEY DESCRIPTION

The third National Health and Nutrition Examination Survey (NHANES III) was the seventh in a series of large health examination surveys conducted in the United States beginning in 1960. Three of these surveys, the National Health Examination Surveys (NHES), were conducted in the 1960's (NCHS, 1965; NCHS, 1967; NCHS, 1969). In 1970, an expanded nutrition component was added to provide data with which to assess nutritional status and dietary practices, and the name was changed to the National Health and Nutrition Examination Survey (Miller, 1973; Engel, 1978; McDowell, 1981). A special survey of Hispanic populations in the United States was conducted during 1982-1984 (NCHS, 1985).

The general structure of the NHANES III sample design was similar to that of the previous NHANES. All of the surveys used complex, multi-stage, stratified, clustered samples of civilian, noninstitutionalized populations. NHANES III was the first NHANES without an upper age limit; in fact, the age range for the survey was two months and older. A home examination option was employed for the first time in order to obtain examination data for very young children and for elderly persons who were unable to visit the mobile examination center (MEC). The home examination included only a subset of the components used in the full MEC examination since it would have been difficult to collect some types of data in a home setting. A detailed description of design specifications and copies of the data collection forms can be found in the Plan and Operation of the Third National Health and Nutrition Examination Survey, 1988-1994 (NCHS, 1994; U.S. DHHS, 1996).

NHANES III was conducted from October 1988 through October 1994 in two phases, each of which comprised a national probability sample. The first phase was conducted from October 18, 1988, through October 24, 1991, at 44 locations. The second phase was conducted from September 20, 1991, through October 15, 1994, at 45 different locations. In NHANES III, 39,695 persons were selected over the six years; of those, 33,994 (86%) were interviewed in their homes. All interviewed persons were invited to the MEC for a medical examination. Seventy-eight percent (30,818) of the selected persons were examined in the MEC, and an additional 493 persons were given a special, limited examination in their homes.

Data collection began with a household interview. Several questionnaires were administered in the household: Household Screener Questionnaire, Family Questionnaire, Household Adult Questionnaire, and Household Youth Questionnaire.

At the MEC, an examination was performed, and five automated questionnaires or interviews were administered: MEC Adult Questionnaire, MEC Youth Questionnaire, MEC Proxy Questionnaire, 24-Hour Dietary Recall, and Dietary Food Frequency (ages 12-16 years). The health examination component included a variety of tests and procedures. The examinee's age at the time of the interview and other factors determined which procedures were administered. Blood and urine specimens were obtained, and a number of tests and measurements were performed including body measurements, spirometry, fundus photography, x-rays, electrocardiography, allergy and glucose tolerance tests, and ultrasonography. Measurements were taken of bone

density, hearing, and physical, cognitive, and central nervous system functions. A physician performed a limited standardized medical examination and a dentist performed a standardized dental examination. While some of the blood and urine analyses were performed in the MEC laboratory, most analyses were conducted elsewhere by contract laboratories.

A home examination was conducted for those sample persons aged 2-11 months and aged 20 years or older who were unable to visit the mobile examination center. The home examination consisted of an abbreviated version of the tests and interviews performed in the MEC. Depending on age of the sample person, the components included body measurements, blood pressure, spirometry, venipuncture, physical function evaluation, and a questionnaire to inquire about infant feeding, selected health conditions, cognitive function, tobacco use, and reproductive history.

SAMPLE DESIGN AND ANALYSIS GUIDELINES

Sample Design

The general structure of the NHANES III sample design is the same as that
of the previous NHANES. Each of these surveys used a stratified, multi-stage
probability design. The major design parameters of the two previous NHANES
and the special Hispanic HANES, as well as NHANES III, have been previously
summarized (Miller, 1973; McDowell, 1981; NCHS, 1985; NCHS, 1994). The
NHANES III sample was designed to be self-weighting within a primary
sampling unit (PSU) for subdomains (age, sex, and race-ethnic groups). While
the sample was fairly close to self-weighting nationally for each of these
subdomain groups, it was not representative of the total population, which
includes institutionalized, non-civilian persons that were outside the
scope of the survey.

The NHANES III sample represented the total civilian, noninstitutionalized
population, two months of age or over, in the 50 states and the District of
Columbia of the United States. The first stage of the design consisted of
selecting a sample of 81 PSU's that were mostly individual counties. In a
few cases, adjacent counties were combined to keep PSU's above a minimum
population size. The PSU's were stratified and selected with probability
proportional to size (PPS). Thirteen large counties (strata) were chosen
with certainty (probability of one). For operational reasons, these 13
certainty PSU's were divided into 21 survey locations. After the 13
certainty strata were designated, the remaining PSU's in the United States
were grouped into 34 strata, and two PSU's were selected per stratum (68
survey locations). The selection was done with PPS and without
replacement. The NHANES III sample therefore consists of 81 PSU's or 89
locations.

The 89 locations were randomly divided into two groups, one for each phase.
The first group consisted of 44 and the other of 45 locations. One set
of PSU's was allocated to the first three-year survey period (1988-91) and
the other set to the second three-year period (1991-94). Therefore,
unbiased estimates (from the point of view of sample selection) of health and
nutrition characteristics can be independently produced for both Phase 1
and Phase 2 as well as for both phases combined.

For most of the sample, the second stage of the design consisted of area
segments composed of city or suburban blocks, combinations of blocks, or
other area segments in places where block statistics were not produced in
the 1980 Census. In the first phase of NHANES III, the area segments were
used only for a sample of persons who lived in housing units built before
1980. For units built in 1980 and later, the second stage consisted of sets
of addresses selected from building permits issued in 1980 or later. These
are referred to as "new construction segments." In the second phase, 1990
Census data and maps were used to define the area segments. Because the
second phase followed within a few years of the 1990 Census, new construction
did not account for a significant part of the sample, and the entire sample
came from the area segments.

The third stage of sample selection consisted of households and certain
types of group quarters, such as dormitories. All households and eligible

group quarters in the sample segments were listed, and a subsample was designated for screening to identify potential sample persons. The subsampling rates enabled production of a national, approximately equal-probability sample of households in most of the United States with higher rates for the geographic strata with high Mexican-American populations. Within each geographic stratum, there was a nearly equal-probability sample of households across all 89 stands.

Persons within the sample of households or group quarters were the fourth stage of sample selection. All eligible members within a household were listed, and a subsample of individuals was selected based on sex, age, and race or ethnicity. The definitions of the sex, age, race or ethnic classes, subsampling rates, and designation of potential sample persons within screened households were developed to provide approximately self-weighting samples for each subdomain within geographic strata and at the same time to maximize the average number of sample persons per sample household. Previous NHANES indicated that this increased the overall participation rate. Although the exact sample sizes were not known until data collection was completed, estimates were made. Below is a summary of the sample sizes for the full six-year NHANES III at each stage of selection:

Number of PSU's	81
Number of stands (survey locations)	89
Number of segments	2,144
Number of households screened	93,653
Number of households with sample persons	19,528
Number of designated sample persons	39,695
Number of interviewed sample persons	33,994
Number of MEC-examined sample persons	30,818
Number of home-examined sample persons	493

More detailed information on the sample design and weighting and estimation procedures for NHANES III can be found in the Plan and Operation of the Third National Health and Nutrition Examination Survey, 1988-94 (NCHS, 1994; U.S. DHHS, 1996) and in the Analytic and Reporting Guidelines: Third National Health and Nutrition Examination Survey (NHANES III), 1988-94 (U.S. DHHS, 1996).

Analysis Guidelines

Because of the complex survey design used in NHANES III, traditional methods of statistical analysis based on the assumption of a simple random sample are not applicable. Detailed descriptions of this issue and possible analytic methods for analyzing NHANES data have been described earlier (NCHS, 1985; Yetley, 1987; Landis, 1982; Delgado, 1990). Recent analytic and reporting guidelines that should be used for most NHANES III analyses and publications are contained in Analytic and Reporting Guidelines (U.S. DHHS, 1996). These recommendations differ slightly from those used by analysts for previous NHANES surveys. These suggested guidelines provide a framework to users for producing estimates that conform to the analytic design of the survey. All users are strongly urged to review these analytic and reporting guidelines before beginning any analyses of NHANES III data.

It is important to remember that this set of statistical guidelines is not absolute. When conducting analyses, the analyst needs to use his/her subject matter knowledge (including methodological issues) as well as information about the survey design. The more one deviates from the original analytic categories defined in the sample design, the more important it is to evaluate the results carefully and to interpret the findings cautiously.

In NHANES III, 89 survey locations were randomly divided into two sets or phases, the first consisting of 44 and the other of 45 locations. One set of PSU's was allocated to the first three-year survey period (1988-91) and the other set to the second three-year period (1991-94). Therefore, unbiased national estimates of health and nutrition characteristics can be independently produced for each phase as well as for both phases combined. Computation of national estimates from both phases combined (i.e., total NHANES III) is the preferred option; individual phase estimates may be highly variable. In addition, individual phase estimates are not statistically independent. It is also difficult to evaluate whether differences in individual phase estimates are real or due to methodological differences. That is, differences may be due to changes in sampling methods or data collection methodology over time. At this time, there is no valid statistical test for examining differences between Phase 1 and Phase 2. Therefore, although point estimates can be produced separately for each phase, no test is available to test whether those estimates are significantly different from each other.

NHANES III is based on a complex, multi-stage probability sample design. Several aspects of the NHANES design must be taken into account in data analysis, including the sample weights and the complex survey design. Appropriate sample weights are needed to estimate prevalence, means, medians, and other statistics. Sample weights are used to produce correct population estimates because each sample person does not have the same probability of selection. The sample weights incorporate the differential probabilities of selection and include adjustments for noncoverage and nonresponse. A detailed discussion of nonresponse adjustments and issues related to survey coverage have been published (U.S. DHHS, 1996). With the large oversampling of young children, older persons, black persons, and Mexican-Americans in NHANES III, it is essential that the sample weights be used in all analyses. Otherwise, a misinterpretation of results is highly likely. Other aspects of the design that must be taken into account in data analyses are the strata and PSU pairings from the sample design. These pairings should be used to estimate variances and test for statistical significance. For weighted analyses, analysts can use special computer software packages that use an appropriate method for estimating variances for complex samples such as SUDAAN (Shah, 1995) and WesVarPC (Westat, 1996).

Although initial exploratory analyses may be performed on unweighted data using standard statistical packages and assuming simple random sampling, final analyses should be done on weighted data using appropriate sample weights. A summary of the weighting methodology and the type of sample weights developed for NHANES III is included in Weighting and Estimation Methodology (U.S. DHHS, 1996).

The purpose of weighting the sample data is to permit analysts to produce estimates of statistics that would have been obtained if the entire sampling frame (the United States) had been surveyed. Sample weights can be considered as measures of the number of persons the particular sample observation represents. Weighting takes into account several features of

the survey: the specific probabilities of selection for the individual domains that were oversampled as well as nonresponse and differences between the sample and the total U.S. population. Differences between the sample and the population may arise due to sampling variability, differential undercoverage in the survey among demographic groups, and possibly other types of response errors, such as differential response rates or misclassification errors. Sample weighting in NHANES III was used to:

1. Compensate for differential probabilities of selection among subgroups (i.e., age-sex-race-ethnicity subdomains where persons living in different geographic strata were sampled at different rates);
2. Reduce biases arising from the fact that nonrespondents may be different from those who participate;
3. Bring sample data up to the dimensions of the target population totals;
4. Compensate, to the extent possible, for inadequacies in the sampling frame (resulting from omissions of some housing units in the listing of area segments, omissions of persons with no fixed address, etc.); and
5. To reduce variances in the estimation procedure by using auxiliary information that is known with a high degree of accuracy.

In NHANES III, the sample weighting was carried out in three stages. The first stage involved the computation of weights to compensate for unequal probabilities of selection (objective 1, above). The second stage adjusted for nonresponse (objective 2). The third stage used poststratification of the sample weights to Census Bureau estimates of the U.S. population to accomplish the third, fourth, and fifth objectives simultaneously. In NHANES III, several types of sample weights (see the sample weights table that follows) were computed for the interviewed and examined sample and are included in the NHANES III data file. Also, sample weights were computed separately for Phase 1 (1988-91), Phase 2 (1991-94), and total NHANES III (1988-94) to facilitate analysis of items collected only in Phase 1, only in Phase 2, and over six years of the survey. Three sets of pseudo strata and PSU pairings are provided to use with SUDAAN in variance estimation. Since NHANES III is based on a complex, multi-stage sample design, appropriate sample weights should be used in analyses to produce national estimates of prevalence and associated variances while accounting for unequal probability of selection of sample persons. For example, the final interview weight, WTPFQX6, should be used for analysis of the items or questions from the family or household questionnaires, and the final MEC examination weight, WTPFEX6, should be used for analysis of the questionnaires and measurements administered in the MEC. Furthermore, for a combined analysis of measurements from the MEC examinations and associated medical history questions from the household interview, the final MEC examination weight, WTPFEX6, should be used. We recommend using SUDAAN (Shah, 1995) to estimate statistics of interest and the associated variance. However, one can also use other published methods for variance estimation. Application of SUDAAN and alternative methods, such as the average design effect approach, balance repeated replication (BRR) methods, or jackknife methods for variance estimation, are discussed in Weighting and Estimation Methodology (U.S. DHHS, 1996).

Appropriate Uses of the NHANES III Sample Weights

Final interview weight, WTPFQX6

        Use only in conjunction with the sample interviewed at home and
        with items collected during the household interview.

Final examination (MEC only) weight, WTPFEX6

        Use only in conjunction with the MEC-examined sample and with
        interview and examination items collected at the MEC.

Final MEC+home examination weight, WTPFHX6

        Use only in conjunction with the MEC+home-examined sample and
        with items collected at both the MEC and home.

Final allergy weight, WTPFALG6

        Use only in conjunction with the allergy subsample and with items
        collected as part of the allergy component of the exam.

Final CNS weight, WTPFCNS6

        Use only in conjunction with the CNS subsample and with items
        collected as part of the CNS component of the exam.

Final morning examination (MEC only) subsample weight, WTPFSD6

        Use only in conjunction with the MEC-examined persons assigned to
        the morning subsample and only with items collected in the MEC
        exam.

Final afternoon/evening examination (MEC only) subsample weight, WTPFMD6

        Use only in conjunction with the MEC-examined persons assigned to
        the afternoon/evening subsample and only with items collected in
        the MEC exam.

Final morning examination (MEC+home) subsample weight, WTPFHSD6

        Use only in conjunction with the MEC- and home-examined persons
        assigned to the morning subsample and with items collected during
        the MEC and home examinations.

Final afternoon/evening examination (MEC+home) weight, WTPFHMD6

Use only in conjunction with the MEC- and home-examined persons assigned to the afternoon/evening subsample and with items collected during the MEC and home examinations.

DATA PREPARATION AND PROCESSING PROCEDURES

Automated data collection procedures for the survey were introduced in NHANES III. In the mobile examination centers, data for the interview and examination components were recorded directly onto a computerized data collection form. With the exception of a few independently automated systems, the system was centrally integrated. This operation allowed for ongoing monitoring of much of the data. Before the introduction of the computer-assisted personal interview (CAPI), the household questionnaire data were reviewed manually by field editors and interviewers. CAPI (1992-1994 only) questionnaires featured built-in edits to prevent entering inconsistencies and out-of-range responses. The multi-level data collection and quality control systems are discussed in detail in the Plan and Operation of the Third National Health and Nutrition Examination Survey, 1988-1994 (NCHS, 1994; U.S. DHHS, 1996). All interview, laboratory, and examination data were sent to NCHS for final processing.

Guidelines were developed that provided standards for naming variables, filling missing values and coding conventional responses, handling missing records, and standardizing two-part quantity/unit questionnaire variables. NCHS staff, assisted by contract staff, developed data editing specifications that checked data sets for valid codes, ranges, and skip pattern consistencies and examined the consistency of values between interrelated variables. Comments, collected in both interviews and examination components, were reviewed and recoded when possible. Responses to "Other" and "Specify" were recoded either to existing code categories or to new categories. The documentation for each data set includes notes for those variables that have been recoded and standardized and for those variables that differ significantly from what appears in the original data collection instrument. While the data have undergone many quality control and editing procedures, there still may be values that appear extreme or illogical. Values that varied considerably from what was expected were examined by analysts who checked for comments or other responses that might help to clarify unusual values. Generally, values were retained unless they could not possibly be true, in which case they were changed to "Blank but applicable." Therefore, the user must review each data set for extreme or inconsistent values and determine the status of each value for analysis.

Several editing conventions were used in the creation of final analytic data sets:

1. Standardized variables were created to replace all two-part quantity/unit questions using standard conversion factors. Standardized variables have the same name as the variable of the two-part question with an "S" suffix. For instance, MAPF18S (Months received WIC benefits) in the MEC Adult Questionnaire was created from the two-part response option to question F18, "How long did you receive benefits from the WIC program?," using the conversion factor 12 months per year.

2. Recoded variables were created by combining responses from two or more like variables, or by collapsing responses to create a summary variable for the purpose of confidentiality. Recoded variables have the original variable name with an R suffix. For example, place of birth

variable (HFA6X) in the Family Questionnaire was collapsed to a three
level response category (U.S., Mexico, Other) and renamed HFA6XR.
Generally, only the recoded variable has been included in the data file.

3. Fill values, a series of one or more digits, were used to represent
    certain specific conditions or responses. Below is a list of the fill
    values that were employed. Some of the fill values pertain only to
    questionnaire data, although 8-fill and blank-fill values are found in
    all data sets. Other fill values, not included in this list, are used
    to represent component-specific conditions.

    6-fills = Varies/varied. (Questionnaires only)

    7-fills = Fewer than the smallest number that could be reported within
    the question structure (e.g., fewer than one cigarette per day).
    (Questionnaires only)

    8-fills = Blank but applicable/cannot be determined. This means that
    a respondent was eligible to receive the question, test, or component
    but did not because of refusal, lack of time, lack of staff, loss of
    data, broken vial, language barrier, unreliability, or other similar
    reasons.

    9-fills = Don't know. This fill was used only when a respondent did
    not know the response to a question and said, "I don't know."
    (Questionnaires only)

    Blank fills = Inapplicable. If a respondent was not eligible for a
    questionnaire, test, or component because of age, gender, or specific
    reason, the variable was blank-filled. In the questionnaire, if a
    respondent was not asked a question because of a skip-pattern,
    variables corresponding to the question were blank-filled. For
    examination or laboratory components, if a person was excluded by a
    defined protocol (e.g., screening exclusion questions) and these
    criteria are included in the data set, then the corresponding
    variables were blank-filled for that person. For home examinees,
    variables for examination components and blood tests not performed as
    part of the home examination protocol were blank-filled.

4. For variables describing discrete data, codes of zero (0) were used to
    mean "none," "never," or the equivalent. Value labels for which "0"
    is used include: "has not had," "never regularly," "still taking," or
    "never stopped using." Unless otherwise labeled, for variables
    containing continuous data, "zero" means "zero.

5. Where there are logical skip patterns in the flow of the questionnaire
    or examination component, the skip was indicated by placing the
    variable label of the skip destination in parentheses as part of the
    value label of the response generating the skip. For example, in the
    Physical Function Evaluation, the variable PFPWC (in wheelchair) has a
    value label, "2 No (PFPSCOOT)" that means that the next item for
    persons not in a wheelchair would be represented by the variable,
    PFPSCOOT.

Variable Nomenclature

A unique name was assigned to every NHANES III variable using a standard
convention. By following this naming convention, the origin of each
variable is clear, and there is no chance of overlaying similar variables
across multiple components. Variables range in length from three to eight
characters. The first two variable characters represent the topic (e.g.,
analyte, questionnaire instrument, examination component) and are listed
below alphabetically by topic. For questionnaires administered in the
household, the remainder of the variable name following the first two
characters indicates the question section and number. For example, data
for the response to the Household Adult Questionnaire question B1 are
contained in the variable HAB1. For most laboratory and examination
variables, as well as some other variables, a "P" in the third position
refers to "primary" and the remainder of the variable name is a brief
description of the item. For instance, in the Laboratory Data File,
information on the length of time the person fasted before the first blood
draw is contained in the variable PHPFAST. The variable PHPFAST was derived
as follows: characters 1-2 (PH) refer to "phlebotomy," character 3 (P)
refers to "primary," characters 4-8 (FAST) refer to an abbreviation for
"fasting."

CODE	TOPIC
AT	Alanine aminotransferase (from biochemistry profile)
AM	Albumin (from biochemistry profile)
AP	Alkaline phosphatase (from biochemistry profile)
AL	Allergy skin test
AC	Alpha carotene
AN	Anisocytosis
TM	Antimicrosomal antibodies
TA	Antithyroglobulin antibodies
AA	Apolipoprotein (AI)
AB	Apolipoprotein (B)
AS	Aspartate aminotransferase (from biochemistry profile)
LA	Atypical lymphocyte
AU	Audiometry
BA	Band
BO	Basophil
BS	Basophilic stippling
BC	Beta carotene
BX	Beta cryptoxanthin
BL	Blast
BU	Blood urea nitrogen (BUN) (from biochemistry profile)
BM	Body measurements
BD	Bone densitometry
C1	C-peptide (first venipuncture)
C2	C-peptide (second venipuncture)
CR	C-reactive protein
UD	Cadmium
CN	Central nervous system function evaluation
CL	Chloride (from biochemistry profile)
CO	Cotinine
CE	Creatinine (serum)(from biochemistry profile)
UR	Creatinine (urine)

```
CODE          TOPIC


DM            Demographic
DE            Dental examination
MQ            Diagnostic interview schedule
DR            Dietary recall (total nutrient intakes)
EO            Eosinophil
EP            Erythrocyte protoporphyrin
FR            Ferritin
FB            Fibrinogen
RB            Folate (RBC)
FO            Folate (serum)
FH            Follicle stimulating hormone (FSH)
FP            Fundus photography
GG            Gamma glutamyl transferase (GGT) (from biochemistry profile)
GU            Gallbladder ultrasonography
GB            Globulin (from biochemistry profile)
G1            Glucose (first venipuncture)
G2            Glucose (second venipuncture)
SG            Glucose (from biochemistry profile)
GH            Glycated hemoglobin
GR            Granulocyte
C3            HCO3 (Bicarbonate)(from biochemistry profile)
HD            HDL cholesterol
HP            Helicobacter pylori antibody
HT            Hematocrit
HG            Hemoglobin
AH            Hepatitis A antibody (HAV)
HB            Hepatitis B core antibody (anti-HBc)
SS            Hepatitis B surface antibody (anti-HBs)
SA            Hepatitis B surface antigen (HBsAg)
HC            Hepatitis C antibody (HCV)
DH            Hepatitis D antibody (HDV)
H1            Herpes 1 antibody
H2            Herpes 2 antibody
HX            Home examination (general)
HO            Homocysteine
HF            Household family questionnaire
HA            Household adult questionnaire
HQ            Household questionnaire variables (composite)
HS            Household screener questionnaire
HY            Household youth questionnaire
HZ            Hypochromia
I1            Insulin (first venipuncture)
I2            Insulin (second venipuncture)
UI            Iodine (urine)
FE            Iron
SF            Iron (from biochemistry profile)
LD            Lactate dehydrogenase (from biochemistry profile)
L1            Latex antibody
LC            LDL cholesterol (calculated)
PB            Lead
LP            Lipoprotein (a)
LH            Luteinizing hormone
```

```
CODE           TOPIC

LU             Lutein/zeaxanthin
LY             Lycopene
LM             Lymphocyte
MR             Macrocyte
MC             Mean cell hemoglobin (MCH)
MH             Mean cell hemoglobin concentration (MCHC)
MV             Mean cell volume (MCV)
PV             Mean platelet volume
MA             MEC adult questionnaire
MX             MEC examination (general)
FF             Dietary food frequency (ages 12-16 years)
MP             MEC proxy questionnaire
MY             MEC youth questionnaire
ME             Metamyelocyte
MI             Microcyte
MO             Monocyte
MN             Mononuclear cell
ML             Myelocyte
IC             Normalized calcium (derived from ionized calcium)
OS             Osmolality (from biochemistry profile)
PH             Phlebotomy data collected in MEC (e.g., questions)
PS             Phosphorus (from biochemistry profile)
PF             Physical function evaluation
PE             Physician's examination
PL             Platelet
DW             Platelet distribution width
PK             Poikilocytosis
PO             Polychromatophilia
SK             Potassium (from biochemistry profile)
PR             Promyelocyte
RC             Red blood cell count (RBC)
RW             Red cell distribution width (RDW)
RE             Retinyl esters
RF             Rheumatoid factor antibody
RU             Rubella antibody
WT             Sample weights
SE             Selenium
SI             Sickle cell
NA             Sodium (from biochemistry profile)
SH             Spherocyte
SP             Spirometry
SD             Survey design
TT             Target cell
TE             Tetanus
TH             Thyroid Stimulating Hormone (TSH)
T4             Thyroxine
TB             Total bilirubin (from biochemistry profile)
CA             Total calcium
SC             Total calcium (from biochemistry profile)
TC             Total cholesterol
CH             Total cholesterol (from biochemistry profile)
TI             Total iron binding capacity (TIBC)
TP             Total protein (from biochemistry profile)
```

```
TX            Toxic granulation


CODE          TOPIC

TO            Toxoplasmosis antibody
PX            Transferrin saturation
TG            Triglycerides
TR            Triglycerides (from biochemistry profile)
TY            Tympanometry
UA            Uric acid (from biochemistry profile)
UB            Urinary albumin
VU            Vacuolated cells
VR            Varicella antibody
VA            Vitamin A
VB            Vitamin B12
VC            Vitamin C
VD            Vitamin D
VE            Vitamin E
WC            White blood cell count (WBC)
WW            WISC/WRAT cognitive test
```

GENERAL REFERENCES

Delgado JL, Johnson CL, Roy I, Trevino FM. Hispanic Health and Nutrition
Examination Survey: methodological considerations. Amer J Pub Health
80(suppl.):6-10. 1990.

Engel A, Murphy RS, Maurer K, Collins E. Plan and operation of the HANES I
Augmentation Survey of Adults 25-74 Years, United States, 1974-75.
National Center for Health Statistics. Vital Health Stat 1(14). 1978.

Freeman DH, Freeman JL, Brock DB, Koch GG. Strategies in the multivariate
analysis of data from complex surveys II: an application to the United
States National Health Interview Survey. Int Stat Rev 40(3):317-30. 1976.

Khare M, Mohadjer LK, Ezzati-Rice TM, Waksberg J. An evaluation of
nonresponse bias in NHANES III (1988-91). 1994 Proceedings of the Survey
Research Methods section of the American Statistical Association. 1994.

Landis JR, Lepkowski JM, Eklund SA, Stehouwer SA. A statistical
methodology for analyzing data from a complex survey, the first National
Health and Nutrition Examination Survey. National Center for Health
Statistics. Vital Health Stat 2(92). 1982.

McDowell A, Engel A, Massey JT, Maurer K. Plan and operation of the second
National Health and Nutrition Examination Survey, 1976-80. National Center
for Health Statistics. Vital Health Stat 1(15). 1981.

Miller HW. Plan and operation of the Health and Nutrition Examination
Survey, United States, 1971-1973. National Center for Health Statistics.
Vital Health Stat 1(10a) and (10b). 1973.

National Center for Health Statistics. Plan and initial program of the
Health Examination Survey. Vital Health Stat 1(4). 1965.

National Center for Health Statistics. Plan and operation of a health
examination survey of U.S. youths 12-17 years of age. Vital Health Stat
1(8). 1969.

National Center for Health Statistics. Plan and operation of the Hispanic
Health and Nutrition Examination Survey, 1982-84. Vital Health Stat 1(19).
1985.

National Center for Health Statistics. Plan and operation of the Third
National Health and Nutrition Examination Survey, 1988-94. Vital Health
Stat 1(32). 1994.

National Center for Health Statistics. Plan, operation, and response
results of a program of children's examinations. Vital Health Stat 1(5).
1967.

Shah BV, Barnwell BG, Bieler GS. SUDAAN User's Manual: Software for
Analysis of Correlated Data. Research Triangle Park, NC: Research Triangle
Institute. Release 6.04. 1995.

Skinner CJ. Aggregated analysis: standard errors and significance tests.
In: Skinner CJ, Holt D, Smith TMF, eds. Analysis of complex surveys. New
York: John Wiley and Sons, Inc. 1989.

U.S. Department of Health and Human Services (DHHS). National Center for
Health Statistics. NHANES III reference manuals and reports (CD-ROM).
Hyattsville, MD: Centers for Disease Control and Prevention, 1996.
Available from National Technical Information Service (NTIS), Springfield,
VA. Acrobat .PDF format; includes access software: Adobe Systems, Inc.
Acrobat Reader 2.1.

Westat, Inc. A User's Guide to WesVarPC. Rockville, MD. Westat, Inc.
1996.

Yetley E, Johnson C. Nutritional applications of the Health and Nutrition
Examination Surveys (HANES). Annu Rev Nutr 7:441-63. 1987.

NHANES III SECOND LABORATORY DATA FILE

General Information

Introduction

This laboratory data file contains data in addition to that rleased on the
Series 11, Nos. 1 and 1A CD-ROMs. This documentation presents information that
should be reviewed before proceeding with data analysis.

The documentation for this laboratory data file is divided into four main
sections. The first section, "General Information," provides information about
the contents of the data file. The second section, "Data File Index," includes
a brief description of all the variables on the data set and shows the standard
name of each variable and its position in the data set. The third section,
"Item Descriptions, Codes, Counts, and Notes" provides a description for each
component, the standard variable name and a brief description of the values
that variable can take on, a count of the frequency of occurrence of each
value, notes by variable and appendices as necessary. "References" are provided
in the fourth section.

Blood specimens were collected on examinees aged one year and older at the
mobile examination center (MEC). For those examinees aged one year and
older who did not travel to the MEC, a home examination was conducted. Only
a limited number of tests were performed on specimens collected during the
Home Examination. Appendix 1 lists the laboratory tests by specimen type,
age group, sex, and whether the specimen was collected in the Home Examination.

The analysis of NHANES III laboratory data must be conducted with the key
survey design and basic demographic variables. Other released files may be
linked to the Second Laboratory Data File using the unique survey participant
(sample person) identifier SEQN.

Examinee Screening

Prior to the phlebotomy, a questionnaire was administered to determine an
examinee's eligibility for all phlebotomy procedures (including venipuncture
and the oral glucose tolerance test). It included questions to determine if
it was safe to perform the venipuncture, to document and determine fasting
compliance and to aid in analyzing the results of the laboratory tests
performed. Examinees reporting hemophilia or recent cancer chemotherapy
treatment were excluded from the venipuncture. For those examinees, the
laboratory test results fields for all blood-based laboratory tests were left
blank.

Although examinees aged 12 years and older were instructed to fast for
10-16 hours prior to the morning examination or for six hours before the
afternoon or evening examination, the instructions were not followed
uniformly. Laboratory test results and the duration of the fast have been
included on the data file regardless of the examinee's fasting compliance.
Analysts should consider whether fasting status is crucial before undertaking
analyses. Examinees who reported insulin use during the household
interview were not instructed to fast.

Specimen Collection and Processing Procedures

Detailed specimen collection and processing instructions are discussed in
the Manual for Medical Technicians (U.S. DHHS, 1996). Vials were stored
under appropriate refrigerated (4-8 degrees Centigrade) or frozen (-20
degrees Centigrade) conditions until they were shipped to analytical
laboratories for testing. The analytical methods used by each of the
participating laboratories are described in the Laboratory Procedures Used
for NHANES III (U.S. DHHS, 1996). The manual contains quality control
graphs and statistical summary information for each laboratory test at the
end of the laboratory method description.

Examiner Training and Quality Control

The NHANES III laboratory staff consisted of medical technologists and
phlebotomists. The medical technologists held baccalaureates in medical
technology. Both they and the phlebotomists were certified by the American
Society for Clinical Pathologists or by a similar organization.

All laboratory staff completed comprehensive training in standardized
laboratory procedures before they began working in the MEC. The MEC
phlebotomists completed comprehensive training in pediatric phlebotomy
techniques, including instruction by a pediatric nurse practitioner.
Laboratory team performance was monitored using several techniques. NCHS
and contract consultants used a structured quality assurance evaluation
during unscheduled visits to evaluate both the quality of the laboratory work
and the quality-control procedures. Each laboratory staff person was
observed for equipment operation, specimen collection and preparation, and
testing procedures, and constructive feedback was given to each team. Formal
retraining sessions were conducted annually to ensure that required skill
levels were maintained.

Laboratory Protocol Changes from 1988 to 1994

Most laboratory tests were performed for the entire six years of NHANES
III. For statistical analyses of these laboratory test results, the
appropriate six-year sample weight should be used.

Data Preparation and Processing

Results from urine pregnancy tests are included in the NHANES III Examination
Data File, rather than in the Laboratory Data File.

For laboratory tests with a lower detection limit, results below the lower
detection limit were replaced with a value equal to the detection limit
divided by the square root of two. This value was created to help the user
distinguish a nondetectable laboratory test result from a measured
laboratory test result. Appendix 2 documents the detection limit for each
laboratory test.

The SI unit (le Systeme International d Unites) is an outgrowth of the metric system that has been used throughout most of the world. In addition to providing a uniform international system of units of measurement, a uniform style is prescribed. Laboratory test results not originally reported in SI units were converted to SI units if applicable. Conversion factors, the format of the NHANES and SI results, and NHANES and SI units of measure are in Appendix 3. In converting NHANES III data to SI units, the goal was to preserve the level of detail reported by the laboratories in the original laboratory test result. Therefore, the number of significant digits in the laboratory test results data may be different from that in published references.

```
------------------------------------------------------------------------
                                              Variable
Description                                   Name      Positions
------------------------------------------------------------------------


DEMOGRAPHIC DATA

     HOUSEHOLD SCREENER QUESTIONNAIRE (HSQ)

Sample person identification number ........  SEQN            1-5

Family sequence number .....................  DMPFSEQ         6-10
Examination/interview Status ...............  DMPSTAT         11

Race-ethnicity .............................  DMARETHN        12
Race .......................................  DMARACER        13
Ethnicity ..................................  DMAETHNR        14

Sex ........................................  HSSEX           15
Age at interview (Screener) ................  HSAGEIR         16-17
Age at interview - unit (Screener) .........  HSAGEU          18

Age in months at interview (screener) ......  HSAITMOR        19-22
Family size (persons in family) ............  HSFSIZER        23-24
Household size (persons in dwelling) .......  HSHSIZER        25-26

County code ................................  DMPCNTYR        27-29
FIPS code for State ........................  DMPFIPSR        30-31
Rural/urban code based on USDA code ........  DMPMETRO        32

Census region, weighting(Texas in south) ...  DMPCREGN        33
Poverty Income Ratio (unimputed income) ....  DMPPIR          34-39

     SURVEY DESIGN DATA

Phase of NHANES III survey .................  SDPPHASE        40
Total NHANES III pseudo-PSU ................  SDPPSU6         41
```

```
                    NHANES III Second Laboratory Data File Index
                                  Serum Data

-----------------------------------------------------------------------
                                           Variable
Description                                Name        Positions
-----------------------------------------------------------------------

Total NHANES III pseudo-stratum ............. SDPSTRA6      42-43
Pseudo-PSU for phase 1 ...................... SDPPSU1          44
Pseudo-stratum for phase 1 ................. SDPSTRA1      45-46
Pseudo-PSU for phase 2 ...................... SDPPSU2          47
Pseudo-stratum for phase 2 ................. SDPSTRA2      48-49

      SAMPLING WEIGHTS - TOTAL NHANES III (1988-94)

Total interviewed sample final weight ....... WTPFQX6      50-58
Total MEC-examined sample final weight ...... WTPFEX6      59-67
Total M+H examined sample final weight ...... WTPFHX6      68-76
Total allergy subsample final weight ....... WTPFALG6     77-85
Total CNS subsample final weight ........... WTPFCNS6     86-94
Total morning subsample final wgt .......... WTPFSD6      95-103
Total afternoon/eve subsample final wgt ..... WTPFMD6     104-112
Total M+H morning subsample final wgt ....... WTPFHSD6    113-121
Total M+H afternoon subsample final wgt ..... WTPFHMD6    122-130

      SAMPLING WEIGHTS - NHANES III PHASE 1 (1988-91)

Phase 1 interviewed sample final wgt ........ WTPFQX1     131-139
Phase 1 MEC examined sample final wgt ....... WTPFEX1     140-148
Phase 1 M+H examined sample final wgt ....... WTPFHX1     149-157
Phase 1 allergy subsample final wgt ........ WTPFALG1    158-166
Phase 1 CNS subsample final wgt ............ WTPFCNS1    167-175
Phase 1 morning sess subsample final wgt .... WTPFSD1     176-184
Phase 1 aft/eve subsample final wgt ........ WTPFMD1     185-193
Phase 1 morning M+H subsample final wgt ..... WTPFHSD1    194-202
Phase 1 aft/eve M+H subsample final wgt ..... WTPFHMD1    203-211

      SAMPLING WEIGHTS - NHANES III PHASE 2 (1991-94)

Phase 2 interviewed sample final wgt ........ WTPFQX2     212-220
Phase 2 MEC examined sample final wgt ....... WTPFEX2     221-229
Phase 2 M+H examined sample final wgt ....... WTPFHX2     230-238
Phase 2 allergy subsample final wgt ........ WTPFALG2    239-247
```

```
                    NHANES III Second Laboratory Data File Index
                                  Serum Data

-----------------------------------------------------------------------
                                            Variable
Description                                 Name        Positions
-----------------------------------------------------------------------


Phase 2 CNS subsample final wgt .............  WTPFCNS2      248-256
Phase 2 morning sess subsample final wgt ....  WTPFSD2       257-265
Phase 2 aft/eve subsample final wgt .........  WTPFMD2       266-274
Phase 2 morning M+H subsample final wgt .....  WTPFHSD2      275-283
Phase 2 aft/eve M+H subsample final wgt .....  WTPFHMD2      284-292

       FAY'S BRR REPLICATE INTERVIEW WEIGHTS - TOTAL NHANES III (1988-94)

Replicate 1 final interview weight ..........  WTPQRP1       293-301
Replicate 2 final interview weight ..........  WTPQRP2       302-310
Replicate 3 final interview weight ..........  WTPQRP3       311-319
Replicate 4 final interview weight ..........  WTPQRP4       320-328
Replicate 5 final interview weight ..........  WTPQRP5       329-337
Replicate 6 final interview weight ..........  WTPQRP6       338-346
Replicate 7 final interview weight ..........  WTPQRP7       347-355
Replicate 8 final interview weight ..........  WTPQRP8       356-364
Replicate 9 final interview weight ..........  WTPQRP9       365-373
Replicate 10 final interview weight .........  WTPQRP10      374-382
Replicate 11 final interview weight .........  WTPQRP11      383-391
Replicate 12 final interview weight .........  WTPQRP12      392-400
Replicate 13 final interview weight .........  WTPQRP13      401-409
Replicate 14 final interview weight .........  WTPQRP14      410-418
Replicate 15 final interview weight .........  WTPQRP15      419-427
Replicate 16 final interview weight .........  WTPQRP16      428-436
Replicate 17 final interview weight .........  WTPQRP17      437-445
Replicate 18 final interview weight .........  WTPQRP18      446-454
Replicate 19 final interview weight .........  WTPQRP19      455-463
Replicate 20 final interview weight .........  WTPQRP20      464-472
Replicate 21 final interview weight .........  WTPQRP21      473-481
Replicate 22 final interview weight .........  WTPQRP22      482-490
Replicate 23 final interview weight .........  WTPQRP23      491-499
Replicate 24 final interview weight .........  WTPQRP24      500-508
Replicate 25 final interview weight .........  WTPQRP25      509-517
Replicate 26 final interview weight .........  WTPQRP26      518-526
Replicate 27 final interview weight .........  WTPQRP27      527-535
Replicate 28 final interview weight .........  WTPQRP28      536-544
Replicate 29 final interview weight .........  WTPQRP29      545-553
Replicate 30 final interview weight .........  WTPQRP30      554-562
```

```
--------------------------------------------------------------------
                                        Variable
Description                             Name         Positions
--------------------------------------------------------------------

Replicate 31 final interview weight .........  WTPQRP31      563-571
Replicate 32 final interview weight .........  WTPQRP32      572-580
Replicate 33 final interview weight .........  WTPQRP33      581-589
Replicate 34 final interview weight .........  WTPQRP34      590-598
Replicate 35 final interview weight .........  WTPQRP35      599-607
Replicate 36 final interview weight .........  WTPQRP36      608-616
Replicate 37 final interview weight .........  WTPQRP37      617-625
Replicate 38 final interview weight .........  WTPQRP38      626-634
Replicate 39 final interview weight .........  WTPQRP39      635-643
Replicate 40 final interview weight .........  WTPQRP40      644-652
Replicate 41 final interview weight .........  WTPQRP41      653-661
Replicate 42 final interview weight .........  WTPQRP42      662-670
Replicate 43 final interview weight .........  WTPQRP43      671-679
Replicate 44 final interview weight .........  WTPQRP44      680-688
Replicate 45 final interview weight .........  WTPQRP45      689-697
Replicate 46 final interview weight .........  WTPQRP46      698-706
Replicate 47 final interview weight .........  WTPQRP47      707-715
Replicate 48 final interview weight .........  WTPQRP48      716-724
Replicate 49 final interview weight .........  WTPQRP49      725-733
Replicate 50 final interview weight .........  WTPQRP50      734-742
Replicate 51 final interview weight .........  WTPQRP51      743-751
Replicate 52 final interview weight .........  WTPQRP52      752-760

      FAY'S BRR REPLICATE EXAMINATION WEIGHTS - TOTAL NHANES III (1988-94)

Replicate 1 final exam weight ..............  WTPXRP1       761-769
Replicate 2 final exam weight ..............  WTPXRP2       770-778
Replicate 3 final exam weight ..............  WTPXRP3       779-787
Replicate 4 final exam weight ..............  WTPXRP4       788-796
Replicate 5 final exam weight ..............  WTPXRP5       797-805
Replicate 6 final exam weight ..............  WTPXRP6       806-814
Replicate 7 final exam weight ..............  WTPXRP7       815-823
Replicate 8 final exam weight ..............  WTPXRP8       824-832
Replicate 9 final exam weight ..............  WTPXRP9       833-841
Replicate 10 final exam weight ..............  WTPXRP10      842-850
Replicate 11 final exam weight ..............  WTPXRP11      851-859
Replicate 12 final exam weight ..............  WTPXRP12      860-868
Replicate 13 final exam weight ..............  WTPXRP13      869-877
```

```
------------------------------------------------------------------------
                                        Variable
Description                             Name          Positions
------------------------------------------------------------------------

Replicate 14 final exam weight ..............  WTPXRP14       878-886
Replicate 15 final exam weight ..............  WTPXRP15       887-895
Replicate 16 final exam weight ..............  WTPXRP16       896-904
Replicate 17 final exam weight ..............  WTPXRP17       905-913
Replicate 18 final exam weight ..............  WTPXRP18       914-922
Replicate 19 final exam weight ..............  WTPXRP19       923-931
Replicate 20 final exam weight ..............  WTPXRP20       932-940
Replicate 21 final exam weight ..............  WTPXRP21       941-949
Replicate 22 final exam weight ..............  WTPXRP22       950-958
Replicate 23 final exam weight ..............  WTPXRP23       959-967
Replicate 24 final exam weight ..............  WTPXRP24       968-976
Replicate 25 final exam weight ..............  WTPXRP25       977-985
Replicate 26 final exam weight ..............  WTPXRP26       986-994
Replicate 27 final exam weight ..............  WTPXRP27       995-1003
Replicate 28 final exam weight ..............  WTPXRP28      1004-1012
Replicate 29 final exam weight ..............  WTPXRP29      1013-1021
Replicate 30 final exam weight ..............  WTPXRP30      1022-1030
Replicate 31 final exam weight ..............  WTPXRP31      1031-1039
Replicate 32 final exam weight ..............  WTPXRP32      1040-1048
Replicate 33 final exam weight ..............  WTPXRP33      1049-1057
Replicate 34 final exam weight ..............  WTPXRP34      1058-1066
Replicate 35 final exam weight ..............  WTPXRP35      1067-1075
Replicate 36 final exam weight ..............  WTPXRP36      1076-1084
Replicate 37 final exam weight ..............  WTPXRP37      1085-1093
Replicate 38 final exam weight ..............  WTPXRP38      1094-1102
Replicate 39 final exam weight ..............  WTPXRP39      1103-1111
Replicate 40 final exam weight ..............  WTPXRP40      1112-1120
Replicate 41 final exam weight ..............  WTPXRP41      1121-1129
Replicate 42 final exam weight ..............  WTPXRP42      1130-1138
Replicate 43 final exam weight ..............  WTPXRP43      1139-1147
Replicate 44 final exam weight ..............  WTPXRP44      1148-1156
Replicate 45 final exam weight ..............  WTPXRP45      1157-1165
Replicate 46 final exam weight ..............  WTPXRP46      1166-1174
Replicate 47 final exam weight ..............  WTPXRP47      1175-1183
Replicate 48 final exam weight ..............  WTPXRP48      1184-1192
Replicate 49 final exam weight ..............  WTPXRP49      1193-1201
Replicate 50 final exam weight ..............  WTPXRP50      1202-1210
Replicate 51 final exam weight ..............  WTPXRP51      1211-1219
Replicate 52 final exam weight ..............  WTPXRP52      1220-1228
```

```
                  NHANES III Second Laboratory Data File Index
                            Serum Data

------------------------------------------------------------------------
                                          Variable
Description                               Name        Positions
------------------------------------------------------------------------


      HOUSEHOLD YOUTH QUESTIONNAIRE (HYQ)

Age in months at youth interview ...........  HYAITMO       1229-1232

      MEC EXAMINATION

Language used by SP in MEC .................  MXPLANG            1233
Session for MEC examination ................  MXPSESSR           1234
Day of week of MEC exam ....................  MXPTIDW            1235

Age in months at MEC exam ..................  MXPAXTMR      1236-1239

      HOME EXAMINATION

Day of week of home exam ...................  HXPTIDW            1240
Age in months at home exam .................  HXPAXTMR      1241-1244
Session for home examination ...............  HXPSESSR           1245

SERUM MEASURES

Serum cotinine (ng/mL) .....................  COP           1246-1250
Serum homocysteine: SI (umol/L) ............  HOPSI         1251-1254
Serum vitamin D (ng/mL) ....................  VDP           1255-1259
Serum vitamin D: SI (nmol/L) ...............  VDPSI         1260-1264
Serum thyroxine (ug/dL) ....................  T4P           1265-1268
Serum thyroxine: SI (nmol/L) ...............  T4PSI         1269-1273
Serum thyroid stim hormone (TSH) (uU/mL) ...  THP           1274-1279
Serum thyroid stim hormone: SI (mU/L) ......  THPSI         1280-1285
Serum antimicrosomal antibody (U/mL) .......  TMP           1286-1289
Serum anti-thyroglobulin antibody (U/mL) ...  TAP           1290-1293
Serum helicobacter pylori antibody .........  HPP                1294
Serum h. pylori Cag A seropositivity .......  HPPCAG             1295
```

```
------------------------------------------------------------------------
FILENAME=LAB2                  VERSION 1.0                    N=29314
------------------------------------------------------------------------
                            DEMOGRAPHIC DATA
------------------------------------------------------------------------
        HOUSEHOLD SCREENER QUESTIONNAIRE (HSQ)
------------------------------------------------------------------------
Positions              Item description
SAS name     Counts       and code                            Notes
------------------------------------------------------------------------


    1-5                Sample person identification number
  SEQN        29314     00003-53623
```

```
------------------------------------------------------------------------
                            DEMOGRAPHIC DATA
------------------------------------------------------------------------
        HOUSEHOLD SCREENER QUESTIONNAIRE (HSQ)
------------------------------------------------------------------------
Positions              Item description
SAS name     Counts       and code                            Notes
------------------------------------------------------------------------


    6-10               Family sequence number                See note
  DMPFSEQ     29314     00001-20076

     11                Examination/interview status          See note
  DMPSTAT     28857     2    Interviewed, MEC-examined
               457     3    Interviewed, home-examined
```

```
                    NHANES III Second Laboratory Data File
                              Serum Data


--------------------------------------------------------------------------
                            DEMOGRAPHIC DATA
--------------------------------------------------------------------------
               HOUSEHOLD SCREENER QUESTIONNAIRE (HSQ)
--------------------------------------------------------------------------
Positions            Item description
SAS name    Counts      and code                                    Notes
--------------------------------------------------------------------------


        12               Race-ethnicity                          See note
  DMARETHN    10507   1     Non-Hispanic white
             8756    2     Non-Hispanic black
             8786    3     Mexican-American
             1265    4     Other


        13               Race                                    See note
  DMARACER    19180   1     White
             9091    2     Black
             1037    3     Other
                6    8     Mexican-American of unknown race


        14               Ethnicity                               See note
  DMAETHNR     8786   1     Mexican-American
              788    2     Other Hispanic
            19740    3     Not Hispanic




                    NHANES III Second Laboratory Data File
                              Serum Data


--------------------------------------------------------------------------
                            DEMOGRAPHIC DATA
--------------------------------------------------------------------------
               HOUSEHOLD SCREENER QUESTIONNAIRE (HSQ)
--------------------------------------------------------------------------
Positions            Item description
SAS name    Counts      and code                                    Notes
--------------------------------------------------------------------------


        15               Sex
   *HSSEX     13980   1     Male
             15334   2     Female


     16-17               Age at interview (Screener)             See note
   HSAGEIR    29165   01-89
              149    90     90+


        18               Age at interview-unit (Screener)
   HSAGEU     29314   2     Years
```

```
                    NHANES III Second Laboratory Data File
                                Serum Data

--------------------------------------------------------------------------
                            DEMOGRAPHIC DATA
--------------------------------------------------------------------------
                 HOUSEHOLD SCREENER QUESTIONNAIRE (HSQ)
--------------------------------------------------------------------------
Positions           Item description
SAS name     Counts     and code                               Notes
--------------------------------------------------------------------------

   19-22                Age in months (Screener)              See note
 HSAITMOR     29157     0012-1079
               147      1080   1080+ months
                10      9999   Don't know

   23-24                Family size                           See note
 HSFSIZER      3076     01
               5411     02
               5006     03
               5950     04
               4313     05
               2312     06
               1236     07
                821     08
                428     09
                761     10     10+

   25-26                Household size                        See note
 HSHSIZER      2478     01
               5473     02
               5040     03
               6041     04
               4337     05
               2393     06
               1301     07
                893     08
                459     09
                899     10     10+
```

```
                    NHANES III Second Laboratory Data File
                               Serum Data

-------------------------------------------------------------------------
                            DEMOGRAPHIC DATA
-------------------------------------------------------------------------
                 HOUSEHOLD SCREENER QUESTIONNAIRE (HSQ)
-------------------------------------------------------------------------
Positions            Item description
SAS name    Counts      and code                                   Notes
-------------------------------------------------------------------------


   27-29                County FIPS codes for United States      See note
 DMPCNTYR               counties with populations >= 500,000
            13799       001-439
            15515       Blank


   30-31                State FIPS codes for United States       See note
 DMPFIPSR               counties with populations >= 500,000
              359       04
             4531       06
             1090       12
              900       17
              242       25
              676       26
              312       29
             1662       36
              625       39
              724       42
              276       44
             2044       48
              358       53
            15515       Blank


      32                Urbanization classification based on     See note
 DMPMETRO               USDA Rural/Urban continuum codes.
            14615       1    Central counties of metro areas of
                             1 million population or more,
                             OR,
                             Fringe counties of metro areas of
                             1 million population or more
            14699       2    All other areas
```

```
                       NHANES III Second Laboratory Data File
                                    Serum Data

    ------------------------------------------------------------------------
                              DEMOGRAPHIC DATA
    ------------------------------------------------------------------------
                    HOUSEHOLD SCREENER QUESTIONNAIRE (HSQ)
    ------------------------------------------------------------------------
    Positions           Item description
    SAS name    Counts      and code                                  Notes
    ------------------------------------------------------------------------


            33              Census region                          See note
      DMPCREGN    3740   1     Northeast
                  5498   2     Midwest
                 12639   3     South
                  7437   4     West


         34-39              Poverty Income Ratio                    See note
      DMPPIR        82   00.000  No reported income
                 26503   000.02-11.889
                  2729   888888  Blank but applicable
```

```
------------------------------------------------------------------------
                            DEMOGRAPHIC DATA
------------------------------------------------------------------------
                          SURVEY DESIGN DATA
------------------------------------------------------------------------
Positions            Item description
SAS name    Counts      and code                          Notes
------------------------------------------------------------------------


       40              Phase of NHANES III survey         See note
   SDPPHASE   14833   1     1988-1991
              14481   2     1991-1994


       41              Total NHANES III Pseudo-PSU        See note
   SDPPSU6    14630   1
              14684   2

     42-43             Total NHANES III Pseudo-stratum    See note
   SDPSTRA6   29314   01-49


       44              Phase 1 Pseudo-PSU                 See note
   SDPPSU1     7633   1
               7200   2
              14481   Blank

     45-46             Phase 1 Pseudo-stratum             See note
   SDPSTRA1   14833   01-23
              14481   Blank


       47              Phase 2 Pseudo-PSU                 See note
   SDPPSU2     7080   1
               7401   2
              14833   Blank

     48-49             Phase 2 Pseudo-stratum             See note
   SDPSTRA2   14481   01-23
              14833   Blank
```

```
                  NHANES III Second Laboratory Data File

                              Serum Data

--------------------------------------------------------------------------
                          DEMOGRAPHIC DATA
--------------------------------------------------------------------------
              SAMPLING WEIGHTS - TOTAL NHANES III (1988-94)
--------------------------------------------------------------------------
Positions           Item description
SAS name    Counts      and code                               Notes
--------------------------------------------------------------------------


   50-58                    Total NHANES III interviewed sample    See note
  WTPFQX6                   final weight
            29314   000215.53-0132278.9


   59-67                    Total NHANES III MEC-examined sample   See note
  WTPFEX6                   final weight
              457   000000.00
            28857   000213.45-140778.72


   68-76                    Total NHANES III MEC and home-         See note
  WTPFHX6                   examined final weight
            29314   000214.25-139744.91


   77-85                    Total NHANES III allergy subsample     See note
  WTPFALG6                  final weight
               23   000000.00
            12106   000213.45-288897.91
            17185   Blank


   86-94                    Total NHANES III central nervous       See note
  WTPFCNS6                  system (CNS) subsample final weight
               12   000000.00
             5662   001316.46-295826.48
            23640   Blank


   95-103                   Total NHANES III morning session       See note
  WTPFSD6                   MEC-examined subsample final weight
              920   000000.00
             9127   000450.95-292590.96
            19267   Blank
```

```
------------------------------------------------------------------------
                          DEMOGRAPHIC DATA
------------------------------------------------------------------------
           SAMPLING WEIGHTS - TOTAL NHANES III (1988-94)
------------------------------------------------------------------------
Positions              Item description
SAS name    Counts        and code                          Notes
------------------------------------------------------------------------

   104-112             Total NHANES III afternoon/evening    See note
 WTPFMD6               session MEC-examined subsample final
                       weight
              697      000000.00
             9497      000495.13-256201.99
            19120      Blank

   113-121             Total NHANES III morning session MEC  See note
 WTPFHSD6              and home-examined subsample final
                       weight
              791      000000.00
             9254      000446.49-291479.91
            19269      Blank

   122-130             Total NHANES III afternoon/evening    See note
 WTPFHMD6              session MEC and home-examined
                       subsample final weight
              562      000000.00
             9630      000503.56-256245.36
            19122      Blank
```

```
                    NHANES III Second Laboratory Data File
                                  Serum Data

-------------------------------------------------------------------------
                             DEMOGRAPHIC DATA
-------------------------------------------------------------------------
             SAMPLING WEIGHTS - NHANES III PHASE 1 (1988-91)
-------------------------------------------------------------------------
Positions           Item description
SAS name    Counts      and code                                  Notes
-------------------------------------------------------------------------


   131-139              Phase 1 interviewed sample final     See note
  WTPFQX1               weight
               14833    000461.29-264557.81
               14481    Blank


   140-148              Phase 1 MEC-examined sample          See note
  WTPFEX1               final weight
                 229    000000.00
               14604    000527.01-281557.44
               14481    Blank


   149-157              Phase 1 MEC and home-examined sample See note
  WTPFHX1               final weight
               14833    000513.14-279489.83
               14481    Blank


   158-166              Phase 1 allergy subsample final weight See note
  WTPFALG1         14    000000.00
                6097    000821.62-577795.82
               23203    Blank


   167-175              Phase 1 central nervous system (CNS) See note
  WTPFCNS1              subsample final weight
                   8    000000.00
                2751    002699.84-591652.96
               26555    Blank


   176-184              Phase 1 morning session MEC-examined See note
  WTPFSD1               subsample fnal weight
                 451    000000.00
                4462    001111.36-585181.93
               24401    Blank
```

```
-----------------------------------------------------------------------
                           DEMOGRAPHIC DATA
-----------------------------------------------------------------------
           SAMPLING WEIGHTS - NHANES III PHASE 1 (1988-91)
-----------------------------------------------------------------------
Positions           Item description
SAS name    Counts     and code                                 Notes
-----------------------------------------------------------------------


   185-193                 Phase 1 afternoon/evening session MEC-  See note
 WTPFMD1                   examined subsample final weight
               322     000000.00
              4726     001104.11-506697.07
             24266     Blank


   194-202                 Phase 1 morning session MEC and home-   See note
 WTPFHSD1                  examined subsample final weight
               373     000000.00
              4540     0001091.8-582959.83
             24401     Blank


   203-211                 Phase 1 afternoon/evening session MEC   See note
 WTPFHMD1                  and home-examined subsample final weight
               264     000000.00
              4784     001085.73-507417.05
             24266     Blank
```

```
                    NHANES III Second Laboratory Data File
                               Serum Data

    ----------------------------------------------------------------------
                             DEMOGRAPHIC DATA
    ----------------------------------------------------------------------
               SAMPLING WEIGHTS - NHANES III PHASE 2 (1991-94)
    ----------------------------------------------------------------------
    Positions            Item description
    SAS name    Counts      and code                               Notes
    ----------------------------------------------------------------------


       212-220              Phase 2 interviewed sample final      See note
      WTPFQX2               weight
                    14481   000431.06-243267.38
                    14833   Blank


       221-229              Phase 2 MEC-examined sample           See note
      WTPFEX2               final weight
                      228   000000.00
                    14253   000426.91-262887.56
                    14833   Blank


       230-238              Phase 2 MEC and home-examined sample  See note
      WTPFHX2               final weight
                    14481   0000428.5-262188.52
                    14833   Blank


       239-247              Phase 2 allergy subsample final weight  See note
      WTPFALG2          9   000000.00
                     6009   000426.91-552445.57
                    23296   Blank


       248-256              Phase 2 central nervous system (CNS)  See note
      WTPFCNS2              subsample final weight
                        4   000000.00
                     2911   002632.92-518040.33
                    26399   Blank


       257-265              Phase 2 morning session MEC-examined  See note
      WTPFSD2               subsample fnal weight
                      469   000000.00
                     4665   0000901.9-550430.69
                    24180   Blank
```

```
                   NHANES III Second Laboratory Data File
                              Serum Data

-----------------------------------------------------------------------
                           DEMOGRAPHIC DATA
-----------------------------------------------------------------------
            SAMPLING WEIGHTS - NHANES III PHASE 2 (1991-94)
-----------------------------------------------------------------------
Positions            Item description
SAS name    Counts      and code                               Notes
-----------------------------------------------------------------------

    266-274              Phase 2 afternoon/evening session MEC-  See note
  WTPFMD2                examined subsample final weight
                375      000000.00
               4771      000990.26-512403.98
              24168      Blank

    275-283              Phase 2 morning session MEC and home-   See note
  WTPFHSD2               examined subsample final weight
                418      000000.00
               4714      000892.98-552545.64
              24182      Blank

    284-292              Phase 2 afternoon/evening session MEC   See note
  WTPFHMD2               and home-examined subsample final weight
                298      000000.00
               4846      001007.13-512490.71
              24170      Blank
```

```
                    NHANES III Second Laboratory Data File
                              Serum Data

     ------------------------------------------------------------------------
                            DEMOGRAPHIC DATA
     ------------------------------------------------------------------------
       FAY'S BRR REPLICATE INTERVIEW WEIGHTS - TOTAL NHANES III (1988-94)
     ------------------------------------------------------------------------
     Positions          Item description
     SAS name    Counts     and code                               Notes
     ------------------------------------------------------------------------


        293-301              Replicate 1 final interview weight     See note
      WTPQRP1      29314     000053.27-148435.02


        302-310              Replicate 2 final interview weight     See note
      WTPQRP2      29314     000067.13-143746.82


        311-319              Replicate 3 final interview weight     See note
      WTPQRP3      29314     000047.49-152075.62


        320-328              Replicate 4 final interview weight     See note
      WTPQRP4      29314     000062.62-137241.93


        329-337              Replicate 5 final interview weight     See note
      WTPQRP5      29314     000048.42-147700.94


        338-346              Replicate 6 final interview weight     See note
      WTPQRP6      29314     0000053.1-146803.63


        347-355              Replicate 7 final interview weight     See note
      WTPQRP7      29314     000058.18-145261.07


        356-364              Replicate 8 final interview weight     See note
      WTPQRP8      29314     000048.23-161126.44


        365-373              Replicate 9 final interview weight     See note
      WTPQRP9      29314     000053.27-147301.59


        374-382              Replicate 10 final interview weight    See note
      WTPQRP10     29314     000073.37-0148125.5


        383-391              Replicate 11 final interview weight    See note
      WTPQRP11     29314     000058.31-146940.58
```

```
                  NHANES III Second Laboratory Data File
                               Serum Data

------------------------------------------------------------------------
                            DEMOGRAPHIC DATA
------------------------------------------------------------------------
     FAY'S BRR REPLICATE INTERVIEW WEIGHTS - TOTAL NHANES III (1988-94)
------------------------------------------------------------------------
Positions           Item description
SAS name    Counts     and code                                    Notes
------------------------------------------------------------------------


   392-400              Replicate 12 final interview weight   See note
 WTPQRP12    29314      000053.67-153958.72


   401-409              Replicate 13 final interview weight   See note
 WTPQRP13    29314      000067.93-147395.78


   410-418              Replicate 14 final interview weight   See note
 WTPQRP14    29314      000065.08-138456.05


   419-427              Replicate 15 final interview weight   See note
 WTPQRP15    29314      000062.35-140673.55


   428-436              Replicate 16 final interview weight   See note
 WTPQRP16    29314      000040.28-147603.74


   437-445              Replicate 17 final interview weight   See note
 WTPQRP17    29314      000045.36-154057.83


   446-454              Replicate 18 final interview weight   See note
 WTPQRP18    29314      000070.42-138896.98


   455-463              Replicate 19 final interview weight   See note
 WTPQRP19    29314      000050.96-139447.18


   464-472              Replicate 20 final interview weight   See note
 WTPQRP20    29314      000045.79-156365.73


   473-481              Replicate 21 final interview weight   See note
 WTPQRP21    29314      000049.79-146241.31


   482-490              Replicate 22 final interview weight   See note
 WTPQRP22    29314      000047.25-0154848.6
```

```
                    NHANES III Second Laboratory Data File
                              Serum Data

-------------------------------------------------------------------------
                            DEMOGRAPHIC DATA
-------------------------------------------------------------------------
    FAY'S BRR REPLICATE INTERVIEW WEIGHTS - TOTAL NHANES III (1988-94)
-------------------------------------------------------------------------
Positions          Item description
SAS name    Counts    and code                                      Notes
-------------------------------------------------------------------------


    491-499                Replicate 23 final interview weight    See note
  WTPQRP23    29314     000037.18-148309.04


    500-508                Replicate 24 final interview weight    See note
  WTPQRP24    29314     000057.42-141344.14


    509-517                Replicate 25 final interview weight    See note
  WTPQRP25    29314     000044.13-145105.09


    518-526                Replicate 26 final interview weight    See note
  WTPQRP26    29314     0000066.1-146773.53


    527-535                Replicate 27 final interview weight    See note
  WTPQRP27    29314     000044.88-142455.25


    536-544                Replicate 28 final interview weight    See note
  WTPQRP28    29314     000000046-148272.41


    545-553                Replicate 29 final interview weight    See note
  WTPQRP29    29314     000079.38-153624.57


    554-562                Replicate 30 final interview weight    See note
  WTPQRP30    29314     000058.09-151140.25


    563-571                Replicate 31 final interview weight    See note
  WTPQRP31    29314     000051.39-159963.39


    572-580                Replicate 32 final interview weight    See note
  WTPQRP32    29314     000066.17-132356.37


    581-589                Replicate 33 final interview weight    See note
  WTPQRP33    29314     0000057.8-136762.37
```

```
                    NHANES III Second Laboratory Data File
                                Serum Data

       -----------------------------------------------------------------------
                              DEMOGRAPHIC DATA
       -----------------------------------------------------------------------
         FAY'S BRR REPLICATE INTERVIEW WEIGHTS - TOTAL NHANES III (1988-94)
       -----------------------------------------------------------------------
       Positions          Item description
       SAS name     Counts    and code                                   Notes
       -----------------------------------------------------------------------


          590-598             Replicate 34 final interview weight    See note
         WTPQRP34     29314    000062.28-140628.16


          599-607             Replicate 35 final interview weight    See note
         WTPQRP35     29314    000063.73-154630.49


          608-616             Replicate 36 final interview weight    See note
         WTPQRP36     29314    000067.29-153648.69


          617-625             Replicate 37 final interview weight    See note
         WTPQRP37     29314    000043.47-135065.98


          626-634             Replicate 38 final interview weight    See note
         WTPQRP38     29314    000054.55-152122.87


          635-643             Replicate 39 final interview weight    See note
         WTPQRP39     29314    000050.55-152941.69


          644-652             Replicate 40 final interview weight    See note
         WTPQRP40     29314    000054.45-146815.92


          653-661             Replicate 41 final interview weight    See note
         WTPQRP41     29314    000059.62-141514.78


          662-670             Replicate 42 final interview weight    See note
         WTPQRP42     29314    000068.97-0140162.4


          671-679             Replicate 43 final interview weight    See note
         WTPQRP43     29314    000044.04-150981.83


          680-688             Replicate 44 final interview weight    See note
         WTPQRP44     29314    000040.36-144080.03
```

```
                    NHANES III Second Laboratory Data File
                              Serum Data

    ------------------------------------------------------------------------
                              DEMOGRAPHIC DATA
    ------------------------------------------------------------------------
      FAY'S BRR REPLICATE INTERVIEW WEIGHTS - TOTAL NHANES III (1988-94)
    ------------------------------------------------------------------------
    Positions          Item description
    SAS name    Counts     and code                                  Notes
    ------------------------------------------------------------------------


        689-697             Replicate 45 final interview weight    See note
      WTPQRP45    29314     000054.74-0142465.6


        698-706             Replicate 46 final interview weight    See note
      WTPQRP46    29314     000078.43-137838.21


        707-715             Replicate 47 final interview weight    See note
      WTPQRP47    29314     000052.71-145055.34


        716-724             Replicate 48 final interview weight    See note
      WTPQRP48    29314     000046.91-148787.77


        725-733             Replicate 49 final interview weight    See note
      WTPQRP49    29314     0000072.4-148375.43


        734-742             Replicate 50 final interview weight    See note
      WTPQRP50    29314     000070.53-159394.39


        743-751             Replicate 51 final interview weight    See note
      WTPQRP51    29314     000054.73-0144964.3


        752-760             Replicate 52 final interview weight    See note
      WTPQRP52    29314     000072.04-149087.24
```

```
                    NHANES III Second Laboratory Data File
                              Serum Data

------------------------------------------------------------------------
                           DEMOGRAPHIC DATA
------------------------------------------------------------------------
   FAY'S BRR REPLICATE EXAMINATION WEIGHTS - TOTAL NHANES III (1988-94)
------------------------------------------------------------------------
Positions          Item description
SAS name    Counts    and code                               Notes
------------------------------------------------------------------------


    761-769            Replicate 1 final exam weight        See note
  WTPXRP1      457     000000.00
             28857     000054.73-164698.81


    770-778            Replicate 2 final exam weight        See note
  WTPXRP2      457     000000.00
             28857     0000067.3-164887.24


    779-787            Replicate 3 final exam weight        See note
  WTPXRP3      457     000000.00
             28857     0000048.2-0161201.8


    788-796            Replicate 4 final exam weight        See note
  WTPXRP4      457     000000.00
             28857     000067.24-149561.18


    797-805            Replicate 5 final exam weight        See note
  WTPXRP5      457     000000.00
             28857     000055.97-146312.81


    806-814            Replicate 6 final exam weight        See note
  WTPXRP6      457     000000.00
             28857     000051.48-156250.53


    815-823            Replicate 7 final exam weight        See note
  WTPXRP7      457     000000.00
             28857     000060.06-0157694.3


    824-832            Replicate 8 final exam weight        See note
  WTPXRP8      457     000000.00
             28857     0000053.1-169111.97
```

```
                      NHANES III Second Laboratory Data File
                                  Serum Data

    -----------------------------------------------------------------------
                              DEMOGRAPHIC DATA
    -----------------------------------------------------------------------
      FAY'S BRR REPLICATE EXAMINATION WEIGHTS - TOTAL NHANES III (1988-94)
    -----------------------------------------------------------------------
    Positions          Item description
    SAS name    Counts    and code                                   Notes
    -----------------------------------------------------------------------


       833-841              Replicate 9 final exam weight        See note
     WTPXRP9       457    000000.00
                  28857   000052.31-156939.22


       842-850              Replicate 10 final exam weight       See note
     WTPXRP10      457    000000.00
                  28857   000072.13-0165805.2


       851-859              Replicate 11 final exam weight       See note
     WTPXRP11      457    000000.00
                  28857   000053.54-154918.93


       860-868              Replicate 12 final exam weight       See note
     WTPXRP12      457    000000.00
                  28857   000055.35-164023.88


       869-877              Replicate 13 final exam weight       See note
     WTPXRP13      457    000000.00
                  28857   0000067.9-147355.32


       878-886              Replicate 14 final exam weight       See note
     WTPXRP14      457    000000.00
                  28857   000067.04-154034.72


       887-895              Replicate 15 final exam weight       See note
     WTPXRP15      457    000000.00
                  28857   000062.21-156384.73


       896-904              Replicate 16 final exam weight       See note
     WTPXRP16      457    000000.00
                  28857   000000040-157994.12
```

```
                        NHANES III Second Laboratory Data File
                                  Serum Data

  ------------------------------------------------------------------------
                            DEMOGRAPHIC DATA
  ------------------------------------------------------------------------
     FAY'S BRR REPLICATE EXAMINATION WEIGHTS - TOTAL NHANES III (1988-94)
  ------------------------------------------------------------------------
  Positions           Item description
  SAS name    Counts      and code                              Notes
  ------------------------------------------------------------------------


     905-913                Replicate 17 final exam weight       See note
    WTPXRP17      457    000000.00
                 28857    000048.34-160889.46


     914-922                Replicate 18 final exam weight       See note
    WTPXRP18      457    000000.00
                 28857    0000075.2-153937.93


     923-931                Replicate 19 final exam weight       See note
    WTPXRP19      457    000000.00
                 28857    000056.83-149483.14


     932-940                Replicate 20 final exam weight       See note
    WTPXRP20      457    000000.00
                 28857    0000045.1-165457.71


     941-949                Replicate 21 final exam weight       See note
    WTPXRP21      457    000000.00
                 28857    000055.15-152305.97


     950-958                Replicate 22 final exam weight       See note
    WTPXRP22      457    000000.00
                 28857    000045.53-159746.13


     959-967                Replicate 23 final exam weight       See note
    WTPXRP23      457    000000.00
                 28857    000037.51-158016.62


     968-976                Replicate 24 final exam weight       See note
    WTPXRP24      457    000000.00
                 28857    000054.91-153043.54
```

```
                     NHANES III Second Laboratory Data File
                                 Serum Data


      ------------------------------------------------------------------------
                               DEMOGRAPHIC DATA
      ------------------------------------------------------------------------
        FAY'S BRR REPLICATE EXAMINATION WEIGHTS - TOTAL NHANES III (1988-94)
      ------------------------------------------------------------------------
      Positions          Item description
      SAS name    Counts     and code                                    Notes
      ------------------------------------------------------------------------


         977-985              Replicate 25 final exam weight        See note
       WTPXRP25      457    000000.00
                    28857    000043.77-155179.51


         986-994              Replicate 26 final exam weight        See note
       WTPXRP26      457    000000.00
                    28857    000071.23-168273.22


         995-1003             Replicate 27 final exam weight        See note
       WTPXRP27      457    000000.00
                    28857    000043.82-153212.25


        1004-1012             Replicate 28 final exam weight        See note
       WTPXRP28      457    000000.00
                    28857    000045.61-147920.01


        1013-1021             Replicate 29 final exam weight        See note
       WTPXRP29      457    000000.00
                    28857    000083.17-159279.49


        1022-1030             Replicate 30 final exam weight        See note
       WTPXRP30      457    000000.00
                    28857    000059.05-162389.35


        1031-1039             Replicate 31 final exam weight        See note
       WTPXRP31      457    000000.00
                    28857    000052.61-163894.16


        1040-1048             Replicate 32 final exam weight        See note
       WTPXRP32      457    000000.00
                    28857    000067.05-0149876.8
```

```
-----------------------------------------------------------------------
                         DEMOGRAPHIC DATA
-----------------------------------------------------------------------
  FAY'S BRR REPLICATE EXAMINATION WEIGHTS - TOTAL NHANES III (1988-94)
-----------------------------------------------------------------------
Positions          Item description
SAS name    Counts    and code                             Notes
-----------------------------------------------------------------------


  1049-1057             Replicate 33 final exam weight      See note
  WTPXRP33      457     000000.00
                28857   000055.58-153417.47


  1058-1066             Replicate 34 final exam weight      See note
  WTPXRP34      457     000000.00
                28857   000063.45-156981.83


  1067-1075             Replicate 35 final exam weight      See note
  WTPXRP35      457     000000.00
                28857   000064.47-157897.09


  1076-1084             Replicate 36 final exam weight      See note
  WTPXRP36      457     000000.00
                28857   000067.68-171875.06


  1085-1093             Replicate 37 final exam weight      See note
  WTPXRP37      457     000000.00
                28857   000045.36-153137.39


  1094-1102             Replicate 38 final exam weight      See note
  WTPXRP38      457     000000.00
                28857   000055.94-159979.02


  1103-1111             Replicate 39 final exam weight      See note
  WTPXRP39      457     000000.00
                28857   000057.47-151920.72


  1112-1120             Replicate 40 final exam weight      See note
  WTPXRP40      457     000000.00
                28857   000057.86-157191.41
```

```
------------------------------------------------------------------------
                          DEMOGRAPHIC DATA
------------------------------------------------------------------------
  FAY'S BRR REPLICATE EXAMINATION WEIGHTS - TOTAL NHANES III (1988-94)
------------------------------------------------------------------------
Positions          Item description
SAS name    Counts    and code                               Notes
------------------------------------------------------------------------


   1121-1129              Replicate 41 final exam weight       See note
  WTPXRP41      457    000000.00
                28857  0000061.4-000146023


   1130-1138              Replicate 42 final exam weight       See note
  WTPXRP42      457    000000.00
                28857  000069.57-154624.02


   1139-1147              Replicate 43 final exam weight       See note
  WTPXRP43      457    000000.00
                28857  000044.35-159439.04


   1148-1156              Replicate 44 final exam weight       See note
  WTPXRP44      457    000000.00
                28857  000044.16-155951.73


   1157-1165              Replicate 45 final exam weight       See note
  WTPXRP45      457    000000.00
                28857  000059.87-147941.67


   1166-1174              Replicate 46 final exam weight       See note
  WTPXRP46      457    000000.00
                28857  000074.92-150980.02


   1175-1183              Replicate 47 final exam weight       See note
  WTPXRP47      457    000000.00
                28857  000050.64-151763.92


   1184-1192              Replicate 48 final exam weight       See note
  WTPXRP48      457    000000.00
                28857  0000045.8-156115.62
```

```
                    NHANES III Second Laboratory Data File
                              Serum Data


    ------------------------------------------------------------------------
                             DEMOGRAPHIC DATA
    ------------------------------------------------------------------------
      FAY'S BRR REPLICATE EXAMINATION WEIGHTS - TOTAL NHANES III (1988-94)
    ------------------------------------------------------------------------
    Positions           Item description
    SAS name    Counts      and code                              Notes
    ------------------------------------------------------------------------


      1193-1201             Replicate 49 final exam weight       See note
    WTPXRP49       457    000000.00
                 28857    000082.17-159609.54


      1202-1210             Replicate 50 final exam weight       See note
    WTPXRP50       457    000000.00
                 28857    000071.97-168153.71


      1211-1219             Replicate 51 final exam weight       See note
    WTPXRP51       457    000000.00
                 28857    000054.04-158632.23


      1220-1228             Replicate 52 final exam weight       See note
    WTPXRP52       457    000000.00
                 28857    000073.26-158493.21
```

```
                   NHANES III Second Laboratory Data File
                                Serum Data


-----------------------------------------------------------------------
                            DEMOGRAPHIC DATA
-----------------------------------------------------------------------
                 HOUSEHOLD YOUTH QUESTIONNAIRE (HYQ)
-----------------------------------------------------------------------
Positions             Item description
SAS name    Counts        and code                          Notes
-----------------------------------------------------------------------


   1229-1232          Age in months at household youth      See note
 HYAITMO              interview
            11138     0012-0204
               14     8888  Blank but applicable
            18162     Blank
```


```
                   NHANES III Second Laboratory Data File
                                Serum Data


-----------------------------------------------------------------------
                            DEMOGRAPHIC DATA
-----------------------------------------------------------------------
                            MEC EXAMINATION
-----------------------------------------------------------------------
Positions             Item description
SAS name    Counts        and code                          Notes
-----------------------------------------------------------------------


        1233          Language used by sample person in MEC  See note
 MXPLANG    23936     1    English
             3906     2    Spanish
                3     3    Other
             1469     Blank


        1234          Examination session for MEC           See note
 MXPSESSR             examinees
            13643     1    Morning
             9419     2    Afternoon
             5795     3    Evening
              457     Blank


        1235          Day of week of MEC exam
 MXPTIDW     2884     1    Sunday
             2618     2    Monday
             2503     3    Tuesday
             2914     4    Wednesday
             5466     5    Thursday
             5082     6    Friday
             7390     7    Saturday
              457     Blank
```

```
                 NHANES III Second Laboratory Data File
                            Serum Data


------------------------------------------------------------------------
                          DEMOGRAPHIC DATA
------------------------------------------------------------------------
                          MEC EXAMINATION
------------------------------------------------------------------------
Positions           Item description
SAS name    Counts      and code                              Notes
------------------------------------------------------------------------


   1236-1239              Age in months at MEC exam           See note
  MXPAXTMR    28751      0012-1079
              106        1080  1080+ months
              457        Blank




                 NHANES III Second Laboratory Data File
                            Serum Data


------------------------------------------------------------------------
                          DEMOGRAPHIC DATA
------------------------------------------------------------------------
                          HOME EXAMINATION
------------------------------------------------------------------------
Positions           Item description
SAS name    Counts      and code                              Notes
------------------------------------------------------------------------


       1240              Day of week of home exam
  HXPTIDW       22      1     Sunday
               111      2     Monday
                 6      3     Tuesday
                16      4     Wednesday
               123      5     Thursday
               119      6     Friday
                60      7     Saturday
             28857      Blank


   1241-1244              Age in months at home exam          See note
  HXPAXTMR      410      0252-1079
                47       1080  1080+ months
             28857      Blank


       1245              Examination session for home         See note
  HXPSESSR               examinees
               203      1     Morning
               212      2     Afternoon
                38      3     Evening
                 4      8     Blank but applicable
             28857      Blank
```

```
-------------------------------------------------------------------------
                            SERUM MEASURES
-------------------------------------------------------------------------
Positions          Item description
SAS name    Counts     and code                                  Notes
-------------------------------------------------------------------------

  1246-1250             Serum cotinine (ng/mL)                See note
   COP        2751   0.035 Below level of detection
             19626   00.05-01890
              2823   88888 Blank but applicable
              4114   Blank

  1251-1254             Serum homocysteine: SI (umol/L)       See note
   HOPSI      8585   0002-0132
             20729   Blank

  1255-1259             Serum vitamin D (ng/mL)               See note
   VDP           8   003.5 Below detection limit
             18875   00005-160.3
             10431   Blank

  1260-1264             Serum vitamin D: SI (nmol/L)          See note
   VDPSI         8   008.7 Below detection limit
             18875   012.5-400.1
             10431   Blank

  1265-1268             Serum thyroxine (ug/dL)               See note
   T4P          37   00.4  Below detection limit
             17758   00.5-0032
              2446   8888  Blank but applicable
              9073   Blank

  1269-1273             Serum thyroxine: SI (nmol/L)          See note
   T4PSI        37   005.1 Below detection limit
             17758   006.4-411.8
              2446   88888 Blank but applicable
              9073   Blank
```

```
-------------------------------------------------------------------------
                             SERUM MEASURES
-------------------------------------------------------------------------
Positions            Item description
SAS name    Counts      and code                                    Notes
-------------------------------------------------------------------------

   1274-1279            Serum thyroid stimulating hormone        See note
  THP                   (TSH) (uU/mL)
                64      000.00  Below detection limit
             18084      000.01-000382
              2093      888888  Blank but applicable
              9073      Blank


   1280-1285            Serum thyroid stimulating hormone        See note
  THPSI                 (TSH):  SI (mU/L)
                64      000.00  Below detection limit
             18084      000.01-000382
              2093      888888  Blank but applicable
              9073      Blank


   1286-1289            Serum antimicrosomal antibody
  TMP                   (U/mL)
             15995      00.3  Below detection limit
              2153      00.5-3000
              2093      8888  Blank but applicable
              9073      Blank


   1290-1293            Serum anti-thyroglobulin antibody
  TAP                   (ATA) (U/mL)
             16362      00.7  Below detection limit
              1786      0001-3000
              2093      8888  Blank but applicable
              9073      Blank


       1294             Serum helicobacter pylori               See note
  HPP                   seropositivity (IgG)
              4442      1     Positive
              5397      2     Negative
               332      3     Equivocal
             19143      Blank
```

```
                    NHANES III Second Laboratory Data File
                              Serum Data

-----------------------------------------------------------------------
                            SERUM MEASURES
-----------------------------------------------------------------------
Positions               Item description
SAS name      Counts       and code                            Notes
-----------------------------------------------------------------------

          1295          Serum helicobacter pylori           See note
   HPPCAG               Cag A seropositivity
                2809    1    Positive
                4656    2    Negative
               21849    Blank
```

DEMOGRAPHIC DATA: NOTES

Screener Questionnaire

DMPFSEQ: Family sequence number

    This variable can be used to determine all family members who
    participated in the survey. Sample persons who have identical
    family sequence numbers (i.e. match on all 5 digits) are members
    of the same family.

DMPSTAT: Examination/interview status

    This variable identifies the interview or examination status of all
    persons selected for the NHANES III sample. Interviewed persons completed
    preselected questions in specific sections of the Household Adult or
    Youth Questionnaires. Mobile examination center (MEC)-examined persons
    were interviewed and successfully completed at least one examination
    component in the MEC. Home-examined persons were interviewed and
    successfully completed at least one home examination component. The
    home examination was an option for frail older adults, infants 2-11
    months of age, and other adults who were unable to come to the MEC.

DMARETHN: Race-ethnicity

    This key analytic variable, based on the NHANES III survey design, was
    derived from many sources of data and is based on reported race and
    ethnicity. The other category includes all Hispanics, regardless of
    race, who were not Mexican-American and also includes all non-Hispanics
    from racial groups other than white or black.

DMARACER: Race

    This variable was obtained from two primary sources: the Screener and
    the Family Questionnaires. Prior to the selection of the sample, race
    (Black, White, Other) was self-reported or reported by proxy in the
    Screener Questionnaire. During the administration of the Family
    Questionnaire, race was self-reported or reported by the respondent of
    the Family Questionnaire from five categories (Aleut, Eskimo, American
    Indian, Asian or Pacific Islander, Black, White, Other). Responses from
    the two sources were adjudicated, as necessary, to create a three level
    variable (Black, White, Other).

DMAETHNR: Ethnicity

    This variable was obtained from two primary sources: the Screener and
    the Family Questionnaires. As part of both interviews, hand cards were
    used to determine Mexican/Mexican-American or Other Latin
    American/Spanish ancestry or national origin. Responses of non-Hispanic
    ancestry or national origin were categorized as other. Responses from
    the two interviews were adjudicated, as necessary, and this three
    level variable was created.

HSAGEIR: Age (Screener Questionnaire)

    Age was calculated using the birth date which was obtained from the
    Screener Questionnaire. The variable HSAGEU provides the age unit
    (months or years) for HSAGEIR. Ages of 90 years or greater were recoded
    into a single category of 90+ years to help protect the confidentiality
    of survey participants.

HSAITMOR: Age in months (Screener Questionnaire)

    Age in months was calculated by computing number of months between the
    Screener Questionnaire date and date of birth. This variable was
    created for analyses where exact age at the interview may be needed.
    HSAITMOR differs slightly from the age in years (HSAGEIR), the variable
    most often used for analyses. Ages of 1080 months and older (90 years
    and older) were recoded into a single category of 1080+ months to
    protect the confidentiality of survey participants.

HSFSIZER: Family Size

    Family size represents the total number of related persons living in a
    household (single dwelling unit). All household members were rostered
    by family during the Screener interview. Household members who were
    related to the family reference person (knowledgeable household member
    17 years or older who owned or rented the dwelling unit) by blood or
    marriage were considered part of the family. Adopted children, foster-
    and god-children were also included, if they were living in the dwelling
    unit. However, family members who were away at college, or living
    independently were not included. Other household members who were
    unrelated to the reference person were considered members of separate
    families. Families with 10 members or more were recoded into a single
    response category of 10+ persons to help protect confidentiality. See
    note for Household Size (HSHSIZER).

HSHSIZER: Household Size

    Household size represents the total number of persons living in a single
    dwelling unit, both related and unrelated. All permanent household
    members were rostered according to their family as part the Screener
    interview. This was done in order to obtain a complete list of all
    persons living or staying in the dwelling unit, and to distinguish
    household and family members. Households with 10 members or more were
    recoded into a single response category of 10+ persons to help protect
    confidentiality. See note for Family Size (HFHSIZER).

DMPCNTYR: County FIPS codes for United States counties with populations of
                  500,000 and more

    These county FIPS codes identify large counties with populations of
    500,000 and more that were sampled in the survey. Counties with

population less than 500,000 are not included to prevent identification
of these locations. See Appendix 1 for listing of codes.

DMPFIPSR: State FIPS codes for United States counties with populations of
          500,000 and more

    These state FIPS codes identify counties with populations of 500,000+
    that were sampled in the survey. Counties with population less than
    500,000 are not included to prevent identification of these locations.
    See Appendix 1 for listing of codes.

DMPMETRO: Urbanization classification based on USDA Rural-Urban
          continuum codes

    These classifications are based on the USDA Rural-Urban codes (Butler and
    Beale, 1993) that describe metro and nonmetro counties by degree of
    urbanization and nearness to metro areas. The USDA codes were recoded
    into two categories to prevent identification of counties that were
    sampled in the survey.

DMPCREGN: Census region

    The United States was divided into four broad geographic regions as
    defined by the Bureau of Census. Because all states were not included in
    the selected sample, regional estimates may not be representative for a
    given region.

DMPPIR: Poverty income ratio (or poverty index)

    The poverty income ratio (PIR) was computed as a ratio of two
    components. The numerator was the midpoint of the observed family
    income category in the Family Questionnaire variable:HFF19R. The
    denominator was the poverty threshold, the age of the family reference
    person, and the calender year in which the family was interviewed.

    Poverty threshold values (in dollars) are produced annually by the
    Census Bureau (Series P-60). These threshold values are based on
    calendar years and adjusted for changes caused by inflation between
    calendar years. Reports for each of the calendar years in the survey
    (1988-94) were used in the calculation of PIR. For the years 1991 and
    1994, data from preliminary reports were used. The poverty income ratio
    allows income data to be analyzed in a comparable manner across the six
    years of the survey and with previous NHANES.

    Persons who reported having had no income and were assigned a zero value
    for PIR. A substantial proportion of persons refused to report their
    income or income category during the Family Questionnaire. Due to the
    income nonresponse the potential for bias in PIR may be high. Users are
    cautioned to examine potential nonresponse bias for PIR and
    other income variables.

Survey Design Data

SDPPHASE: Phase of NHANES III survey

    For operational purposes, 81 primary sampling units were divided into 89
    survey locations (or stands) and randomly allocated to two three-year
    phases. Phase 1 data were collected from October 1988 through October
    1991 and Phase 2 data were collected from October 1991 through October
    1994.

SDPSTRA6, SDPSTRA1, SDPSTRA2, and SDPPSU6, SDPPSU1, SDPPSU2: Pseudo strata
                codes and pseudo PSU pair codes

    Because NHANES III was based upon a complex sample design, the
    assumptions of many statistical tests and routinely available
    statistical programs are not met. For this reason, when estimates of
    the variances of statistics are computed, the technique of estimation
    must be based upon complex sampling theory. In order to provide users
    with the capability of estimating the complex sample variances, 49
    pseudo strata and a pair of Primary Sampling Unit (PSU) codes per
    stratum were designed.

    A software package, "SUDAAN- Software for the Statistical Analysis of
    Correlated Data" (Shah, 1995), was developed by the Research Triangle
    Institute to analyze complex sample design data like NHANES. SUDAAN
    uses strata and PSU codes to conduct analysis with two PSU per stratum
    design. Therefore, definition of pseudo strata and PSU provided in this
    data file should be used to compute complex sample variances in
    analyses. Other software available for estimation of complex sample
    variance may also be used. For further discussion of methods of
    variance estimation in NHANES III, see additional information on this
    subject in Weighting and Estimation Methodology (U.S. DHHS, 1996) and
    NHANES III Analytic and Reporting Guidelines (U.S. DHHS, 1996).

Sampling Weights

WTPFQX6, WTPFQX1, WTPFQX2: Total NHANES III and phase-specific final
                interview weights

    These sampling weights should be used only for items collected during
    the household interviews. To compute final interview weights, final
    basic weights were first adjusted for nonresponse to household
    interview, then post-stratified to the unpublished Current Population
    Survey 1990 (Phase 1) and 1993 (Phase 2) population control estimates of
    the U.S. population adjusted for undercount. For details, see
    Weighting and Estimation Methodology (U.S. DHHS, 1996) and NHANES III
    Analytic and Reporting Guidelines (U.S. DHHS, 1996).

WTPFEX6, WTPFEX1, WTPFEX2: Total NHANES III and phase-specific final MEC
                examination weights

      These MEC sampling weights should be used for analysis of measurements
      or interview items collected in the MEC. Persons who were not examined
      in the MEC have a sampling weight of zero and should be excluded from
      analyses. To compute final MEC examination weights, final interview
      weights were first adjusted for nonresponse to MEC examinations, then
      post-stratified to the unpublished Current Population Survey 1990
      (Phase 1) and 1993 (Phase 2) population control estimates of the U.S.
      population adjusted for undercount. For details, see Weighting and
      Estimation Methodology(U.S. DHHS, 1996) and NHANES III Analytic and
      Reporting Guidelines (U.S. DHHS, 1996).

WTPFHX6, WTPFHX1, WTPFHX2: Total NHANES III and phase-specific MEC+home
                examination weights

      These MEC+home sampling weights should be used for analysis of the
      examination items where measurements or interview items were collected
      in the MEC and home. Persons who were not examined in the MEC or home
      have a sampling weight of zero and should be excluded from analyses. To
      compute final MEC+home examination weights, final interview weights were
      first adjusted for nonresponse to MEC and home examinations, then
      post-stratified to unpublished Current Population Survey 1990 (Phase 1)
      and 1993 (Phase 2) population control estimates of the U.S. population
      adjusted for undercount. No separate sampling weights were computed for
      home examinees. For details, see Weighting and Estimation Methodology
      (U.S. DHHS, 1996) and NHANES III Analytic and Reporting Guidelines
      (U.S. DHHS, 1996).

WTPFALG6, WTPFALG1, WTPFALG2: Total NHANES III and phase-specific allergy
                examination subsample weights

      These subsample weights are for analysis of allergy measurements.
      Allergy skin reactivity tests were administered to all MEC-examined
      persons aged 6-19 years and a random half-sample of the adults aged
      20-59 years. Eligible MEC-examined persons who did not complete the
      allergy tests have a sampling weight of zero and should be excluded from
      the analyses. Final MEC examination weights were first adjusted for
      selection of the half-sample among adults (20-59 years), and
      post-stratified to the unpublished Current Population Survey 1990 (Phase
      1) and 1993 (Phase 2) population control estimates of the U.S.
      population adjusted for undercount in the final step. For details, see
      Weighting and Estimation Methodology (U.S. DHHS, 1996) and NHANES III
      Analytic and Reporting Guidelines (U.S. DHHS, 1996).

WTPFCNS6, WTPFCNS1, WTPFCNS2: Total NHANES III and phase-specific central
                nervous system (CNS) examination subsample final weights

      These subsample weights are for analysis of measurements from the
      Central Nervous System (CNS) test. The CNS examination was administered

to a random half-sample of the adults aged 20-69 years. Eligible
MEC-examined persons who did not complete CNS testing have a sampling
weight of zero and should be excluded from the analyses. Final MEC
examination weights were first adjusted for selection of half sample
among adults (20-59 years), and post-stratified to unpublished Current
Population Survey 1990 (Phase 1) and 1993 (Phase 2) population control
estimates of the U.S. population adjusted for undercount in the final
step. For details, see Weighting and Estimation Methodology
(U.S. DHHS, 1996) and NHANES III Analytic and Reporting Guidelines
(U.S. DHHS, 1996).

WTPFSD6, WTPFSD1, WTPFSD2: Total NHANES III and phase-specific morning
                    session MEC examination subsample final weights

    These subsample weights are for special analyses where fasting time may
    be an important factor. They were computed for persons aged 12 years
    and older who were scheduled and examined in the MEC morning session.
    Sampled households in the survey were randomly assigned to one of two
    groups -- morning session ("standard") or afternoon/evening session
    ("modified") assignments. All sample persons from a household received
    the same session assignment and were requested to schedule examinations
    for the assigned session. Fasting instructions varied by age and
    session assignment (Plan and Operation of The Third National Health and
    Nutrition Examination Survey, 1988-94 , U.S. DHHS, 1996). It should be
    noted that actual fasting time may have differed from the instructed
    fasting time and can be obtained from the variable PHPFAST in the NHANES
    III Laboratory Data File. To compute these weights, final MEC
    examination weights were first adjusted for the random half selection,
    then adjusted for the non-response to assigned session, and finally,
    post-stratified to the unpublished Current Population Survey 1990 and
    1993 Population control estimates of the U.S. population adjusted for
    undercount. Eligible MEC-examined persons who were assigned to the
    morning session and examined in another session have a sampling weight
    of zero and should be excluded in analyses. For details, see Weighting
    and Estimation Methodology (U.S. DHHS, 1996) and NHANES III Analytic and
    Reporting Guidelines (U.S. DHHS, 1996).

WTPFMD6, WTPFMD1, WTPFMD2: Total NHANES III and phase-specific
                    afternoon/evening session MEC examination subsample final
                    weights

    These subsample weights are for special analyses where fasting time
    might be an important factor. They were computed for MEC examined
    persons aged 12 years and older who were scheduled and examined in the
    afternoon or evening sessions. Sampled households in the survey were
    randomly assigned to one of two groups -- morning session ("standard")
    or afternoon/evening session ("modified") assignments. All sample
    persons from a household received the same session assignment and were
    requested to schedule examinations for the assigned session. Fasting
    instruction varied by age and session assignments (Plan and Operation
    of the Third National Health and Nutrition Examination Survey, 1988-94,
    U.S. DHHS, 1996). It should be noted that actual fasting time may have
    differed from the instructed fasting time and can be obtained from the
    variable PHPFAST in the NHANES III Laboratory Data File. To compute

these weights, final MEC examination weights were first adjusted
for the random half selection, then adjusted for the nonresponse to
assigned session, and finally, post-stratified to the unpublished Current
Population Survey 1990 and 1993 population control estimates of the U.S.
population adjusted for undercount. Eligible MEC examined persons who
were assigned to the afternoon or evening sessions and examined in
another session have a sampling weight of zero and should be excluded in
analyses. For details, see Weighting and Estimation Methodology
(U.S.DHHS, 1996) and NHANES III Analytic and Reporting Guidelines
(U.S. DHHS, 1996).

WTPFHSD6, WTPFHSD1, WTPFHSD2: Total NHANES III and phase-specific morning
                  session MEC+home examination subsample final post
                  stratified weights

   These subsample weights are for special analyses where fasting time may
   be an important factor. They were computed for MEC+home examined
   persons aged 12 years and older who were scheduled and examined in the
   morning session. Sampled households in the survey were randomly
   assigned to one of two groups -- morning session ("standard") or
   afternoon/evening session ("modified") assignments. All sample persons
   from a household received the same session assignment and were requested
   to schedule examinations for the assigned session. Fasting instruction
   varied by age and session assignments (Plan and Operations of the Third
   National Health and Nutrition Examination Survey, 1988-94, U.S. DHHS,
   1996). It should be noted that actual fasting time may have differed from
   the instructed fasting time and can be obtained from the variable PHPFAST
   in the NHANES III Laboratory Data File. To compute these weights, final
   MEC+home examination weights were first adjusted for the random half
   selection, then adjusted for the nonresponse to assigned session, and
   finally, post-stratified to the unpublished Current Population Survey
   1990 and 1993 population control estimates of the U.S. population adjusted
   for undercount. Eligible MEC+home examined persons who were assigned to
   the morning session and examined in another session have a sampling weight
   of zero and should be excluded in analyses. For details, see Weighting
   and Estimation Methodology (U.S. DHHS, 1996) and NHANES III Analytic and
   Reporting Guidelines (U.S. DHHS, 1996).

WTPFHMD6, WTPFHMD1, WTPFHMD2: Total NHANES III and phase-specific afternoon/
                  evening MEC+home examination subsample final weights

   These subsample weights are for special analyses where fasting time may
   be an important factor. They were computed for MEC+home examined
   persons aged 12 years and older who were scheduled and examined in the
   afternoon or evening sessions. Sampled households in the survey were
   randomly assigned to one of two groups -- morning session ("standard")
   or afternoon/evening session ("modified") assignments. All sample
   persons from a household received the same session assignment and were
   requested to schedule examinations for the assigned session. Fasting
   instruction varied by age and session assignments (Plan and Operation
   of the Third National Health and Nutrition Examination Survey, U.S. DHHS,
   1996). It should be noted that actual fasting time may have differed from
   the instructed fasting time. The actual fasting time can be obtained from
   the variable PHPFAST in the NHANES III Laboratory Data File. To compute

these weights, final MEC+home examination weights were first adjusted for the random half selection, then adjusted for the nonresponse to assigned session, and finally, post-stratified to the unpublished Current Population Survey 1990 and 1993 population control estimates of the U.S. population adjusted for undercount. Eligible MEC+home examined persons who were assigned to the afternoon or evening sessions and examined in another session have a sampling weight of zero and should be excluded in analyses. For details, see Weighting and Estimation Methodology (U.S. DHHS, 1996) and NHANES III Analytic and Reporting Guidelines (U.S. DHHS, 1996).

WTPQRP1--WTPQRP52: Fay's BRR Replicate interview sample

To allow for alternative methods to estimate variance, 52 replicate weights were computed using repeated sampling method where WESVAR or other software that use repeated samples, can be used for estimating variance. Fay's method (see Fay, 1990; Judkins, 1990) was used to draw half samples and adjust sampling weights in each of the random half samples. Sampling weights in one half sample were multiplied by the factor k=1.7 and in the other half sample by k=0.3 using the Fay's method. After this adjustment, sampling weights were further adjusted for non-response and post-stratified using the same procedure as the final full sample interview weights. These weights should be used only for estimating variance of items from the household adult and youth interviews. For details, see Weighting and Estimation Methodology (U.S. DHHS, 1996) and NHANES III Analytic and Reporting Guidelines (U.S. DHHS, 1996).

WTPXRP1--WTPXRP52: Fay's BRR Replicate weights for MEC- examined sample

To allow for alternative methods to estimate variance, 52 replicate weights were computed using repeated sampling method where WESVAR or other BRR type software can be used to estimate variance. Fay's method (see Fay, 1990; Judkins, 1990) was used to draw half samples and adjust sampling weights in each of the random half samples. Sampling weights in one half sample were multiplied by the factor k=1.7 and in the other half sample by k=0.3 using Fay's method. After this adjustment, weights were further adjusted for nonresponse and were post-stratified using the same procedure as the full sample final weights. These weights should be used only for estimating variance of outcome measurements or interview items from the MEC Examination. For details, see additional information on this subject in Weighting and Estimation Methodology (U.S. DHHS, 1996) and NHANES III Analytic and Reporting Guidelines (U.S. DHHS, 1996).

Household Youth Questionnaire

HYAITMO: Age in months (Household Youth Interview)

Age in months was calculated by computing number of months between Household Youth Interview date and the date of birth. It was created for

special analyses where exact age at the interview may be needed. This computed age may be different from the self-reported age in HSAGEIR and HSAGEU, or HSAITMOR. For most analyses, age reported in HSAGEIR (and HSAGEU) should be used.

MEC Examination

MXPLANG: Language of MEC examination

   This variables designates the language of conduct for the MEC examination. questionnaires were designed to be implemented in a bilingual (English/Spanish) format so that respondents could to be interviewed in their preferred language. When it was necessary to conduct an interview in a another language, a translator assisted the interviewer in administering the questionnaires. These interviews were coded as other.

MXPSESSR: Examination session for MEC examinees

   This variable designates the period during the day that the examination occurred. To increase response rates and allow flexibility, examinations were scheduled in three sessions: morning, afternoon and evening. On occasion, more than one session was attended in order to complete the full examination. In such a situation, the session was coded as the one when most of the examinations were completed.

MXPAXTMR: Age in months at MEC examination

   Age in total months was created for special analyses where exact age at the examination may be needed (e.g., computation of growth charts). It was calculated by computing number of months between examination date and the date of birth. Some examinees may have had a birthday between household interview and examination so that this computed age at examination may differ slightly from the age reported in HSAGEIR (and HSAGEU), or HSAITMOR. For most analyses age reported in HSAGEIR (and HSAGEU) should be used. Ages of 1080 months and older (90 years and older) were recoded into a single category of 1080+ months to protect the confidentiality of survey participants.

Home Examination

HXPAXTMR: Age in months at home examination

   Age in total months was created for special analyses where exact age at the examination may be needed (e.g., computation of growth charts). It was calculated by computing number of months between examination date and the date of birth. Some examinees may have had a birthday between household interview and examination so that this computed age at examination may differ slightly from the age reported in HSAGEIR (and HSAGEU), or HSAITMOR. For most analyses age reported in HSAGEIR (and HSAGEU) should be used. Ages of 1080 months and older (90 years and

older) were recoded into a single category of 1080+ months to protect
the confidentiality of survey participants.

HXPSESSR: Examination session for home examinees

This variable designates the period during the day that the examination
occurred. To increase response rates and allow flexibility, examinations
were scheduled in three sessions: morning, afternoon and evening. On
occasion, more than one session was attended in order to complete the full
examination. In such a situation, the session was coded as the one when
most of the examinations were completed.

References

Butler MA, Beale CL. Rural-urban continuum codes for metro and nonmetro counties, 1993. Agriculture and Rural Economy Division, Economic Research Services, U.S. Department of Agriculture, Staff Report No. AGES-9425, 1993.

Fay RE. VPLX: Variance Estimates for Complex Surveys. In: Proceedings of the Survey Research Methods section of the American Statistical Association, pp. 266-271, 1990.

Judkins DR. Fay's method for variance estimation. Journal of Official Statistics 6 (3):223-239. 1990.

U.S. Department of Health and Human Services(DHHS). National Center for Health Statistics. NHANES III Reference Manuals and Reports (CD-ROM). Hyattsville,Md.: Centers for Disease Control and Prevention, 1996. Available from National Technical Information Service (NTIS), Springfield,Va. (Acrobat.PDF format; includes access software: Adobe Systems Inc. Acrobat Reader 2.1)

Shah BV, Barnwell BG, Bieler GS. SUDAAN User's Manual: Software for Analysis of Correlated Data, Release 6.04. Research Triangle Park, North Carolina. 1995.

Appendix 1. State and county FIPS codes for areas with populations
             of 500,000 or more.

DMPFIPSR	State	DMPCNTYR	County
4	Arizona	13	Maricopa
6	California	1	Alameda
6	California	19	Fresno
6	California	37	Los Angeles
6	California	59	Orange
6	California	71	San Bernardino
6	California	73	San Diego
6	California	85	Santa Clara
6	California	111	Ventura
12	Florida	25	Dade
12	Florida	31	Duval
12	Florida	99	Palm Beach
17	Illinois	31	Cook
25	Massachusetts	17	Middlesex
26	Michigan	125	Oakland
26	Michigan	163	Wayne
29	Missouri	189	St Louis
36	New York	29	Erie
36	New York	47	Kings
36	New York	59	Nassau
36	New York	61	New York
36	New York	81	Queens
36	New York	119	Westchester
39	Ohio	35	Cuyahoga
39	Ohio	61	Hamilton
42	Pennsylvania	3	Allegheny
42	Pennsylvania	45	Delaware
42	Pennsylvania	101	Philadelphia
44	Rhode Island	7	Providence
48	Texas	29	Bexar
48	Texas	113	Dallas
48	Texas	141	El Paso
48	Texas	201	Harris
48	Texas	439	Tarrant
53	Washington	33	King

Special Notes

Blank Result Field

        Some laboratory tests were performed after the survey was completed.
        Examinees who did not have a specimen available for these tests, or
        were not in the age range eligible for the test have a blank in the
        result field.

        Laboratory tests that were performed during the survey have a blank
        in the result field if the examinee was not eligible for the test
        (for example, not in the age range to be tested). If there was
        insufficient specimen for the test but the examinee was eligible,
        the result field is coded as blank but applicable.

NHANES III Reference Manuals

        For analytical methods see U.S. Department of Health and Human
        Services (DHHS). National Center for Health Statistics. NHANES III
        reference manuals and reports (CD-ROM). Hyattsville, MD: Centers
        for Disease Control and Prevention, 1996. Available from National
        Technical Information Service (NTIS), Springfield, VA. Acrobat .PDF
        format; includes access software: Adobe Systems, Inc. Acrobat Reader
        2.1.

Laboratory Tests
     COP:
        Cotinine results from 1988-1994 are included in this field.
        The July 1997 data release contained results from 1988-1991. This
        test was performed on examinees aged 4 years and above.

        NOTE: Users are advised to use this field for analysis rather than
        data from the first release because additional phase 1 data
        (1988-1991) data and the phase 2 data(1991-1994) have been added.
        For the analytical method, see the NHANES III reference manuals (see
        above).

     HOPSI:
        Serum homocysteine testing was performed on examinees aged 12 years
        and older in phase II only (1991-1994).

        For the analytical method see the NHANES III reference manuals (see
        above).

     HPP:
        Helicobacter pylori antibody was measured in 1993 on 6-19 year old
        examinees from phase 1 (1988-1991) of the survey using an enzyme-
        linked immunoassay (ELISA)(Pylori Staat, Whittaker Bioproducts,
        Walkersville, MD). Examinees 20 years and older from phase 1 were
        tested for H. Pylori antibody in 1996 using H. Pylori IgG ELISA
        (Wampole Laboratories, Cranbury, NJ). An additional immunoassay was
        also performed on examinees age 20 years and above. See HPPCAG for
        details on the second IgG assay.

     HPPCAG:
        For examinees 20 years and older, in addition to determining if H.

Pylori IgG was present, anti-cagA IgG was also measured. This
non-commercial method was developed and standardized by Vanderbuilt
University. The method is described in Blaser MJ, Perez-Perez GI,
Kleanthous H, Cover TL, Peek RM, Chyou PH, Stemmermann GN, and
Nomura A. Infection with Helicobacter pylori strains possessing
cagA is associated with an increased risk of developing
adenocarcinoma of the stomach. Cancer Research 55:2111-2115, 1995.

T4P, T4PSI:
Thyroxine testing was performed on examinees aged 13 years and above.
The T4 laboratory method in the NHANES III reference manuals (see
above) is different from the method used for this result. These
results were determined using an enzyme-based homogeneous immunoassay
on the Hitachi 704.

THP, THPSI: Thyroid stimulating hormone (TSH)

Testing was performed on examinees aged 12 years and above. Results
on specimens sent to the laboratory after March 1993 were reduced by
17% to reflect the change in standards supplied by the manufacturer.

The equation used for the correction was:

Uncorrected value x 0.83 = Corrected value.

Data from March 1993 through October 1994 was adjusted to correspond
with the data tested from October 1988 through February 1993 to allow
the entire data set to be used based on the same method.

For the analytical method see the NHANES III reference manuals (see
above).

VDP:
Vitamin D testing was performed on sera from examinees
aged 12 years and older.

For the analytical method see the NHANES III reference manuals (see
above).

Appendix 1. Blood and Urine Assessments by Specimen Type and Age Group

Some of the blood and urine assessments have footnotes. These footnotes appear
at the end of the appendix.

                        AGE GROUP

1-3 years	4-5 years	6-11 years
	Whole blood	
CBC (1)(5)	CBC (1) (5)	CBC (1) (5)
Differential smear	Differential smear	Differential smear
Lead (5)	Lead (5)	Lead (5)
Protoporphyrin (5)	Protoporphyrin (5)	Protoporphyrin (5)
	RBC folate	RBC folate
	Glycated hemoglobin (5)	Glycated hemoglobin (5)
	Serum	
Iron (5)	Iron (5)	Iron (5)
TIBC (5)	TIBC (5)	TIBC (5)
Ferritin (5)	Ferritin (5)	Ferritin (5)
	Folate (5)	Folate (5)
	Apolipoprotein AI(4)(5)	Apolipoprotein AI(4)(5)
	Apolipoprotein B(4)(5)	Apolipoprotein B(4)(5)
	Cholesterol (5)	Cholesterol (5)
	HDL/LDL (5)	HDL/LDL (5)
	Triglycerides (5)	Triglycerides (5)
	Lp(a)(2)(5)	Lp(a)(2)(5)
	Cotinine (4)	Cotinine (4)
	C-reactive protein (5)	C-reactive protein (5)
	Vitamin A (5)	Vitamin A (5)
	Carotenes (5)	Carotenes (5)
	Retinyl esters (5)	Retinyl esters (5)
	Vitamin E (5)	Vitamin E (5)
	Vitamin B12 (2)	Vitamin B12 (2)
		Helicobacter pylori (4)
	Tetanus	Tetanus
		Vitamin C
		Hepatitis A

Appendix 1. Blood and Urine Assessments by Specimen Type and Age Group
(continued)

AGE GROUP

1-3 years   4-5 years   6-11 years
                         Serum (continued)

                                                Hepatitis B/delta
                                                Hepatitis C
                                                Hepatitis E
                                                Rubella (5)
                                                Varicella (5)

                         Urine

                                                Cadmium
                                                Creatinine
                                                Albumin
                                                Iodine

Appendix 1. Blood and Urine Assessments by Specimen Type and Age Group (continued)

AGE GROUP

12-19 years   20 years and older

Whole blood

CBC (1)(5)   CBC (1)(5)
Differential smear   Differential smear
Lead (5)   Lead (5)
Protoporphyrin (5)   Protoporphyrin (5)
                               RBC folate
Glycated hemoglobin (5)   Glycated hemoglobin (5)

Serum

Iron (5)   Iron (5)
TIBC (5)   TIBC (5)
Ferritin (5)   Ferritin (5)
Folate (5)   Folate (5)
Apolipoprotein AI(4)(5)   Apolipoprotein AI(4)(5)
Apolipoprotein B(4)(5)   Apolipoprotein B(4)(5)
Cholesterol (5)   Cholesterol (5)
HDL/LDL (5)   HDL/LDL (5)
Triglycerides (5)   Triglycerides (5)
Lp(a)(2)(5)   Lp(a)(2)(5)
Cotinine (4)   Cotinine (4)
C-reactive protein (5)   C-reactive protein (5)
                               Rheumatoid factor (60+)
Vitamin A (5)   Vitamin A (5)
Carotenes (5)   Carotenes (5)
Retinyl esters (5)   Retinyl esters (5)
Vitamin E (5)   Vitamin E (5)
Vitamin B12 (2)   Vitamin B12 (2)
Helicobacter pylori (4)
Tetanus   Tetanus
Vitamin C   Vitamin C
Hepatitis A   Hepatitis A
Hepatitis B/delta   Hepatitis B/delta
Hepatitis C   Hepatitis C
Hepatitis E   Hepatitis E
Rubella (5)   Rubella (5)
Varicella (5)   Varicella (5)

Appendix 1. Blood and Urine Assessments by Specimen Type and Age Group
(continued)

AGE GROUP

12-19 years   20 years and older

                        Serum

Diphtheria   Diptheria
Herpes simplex I and II   Herpes simplex I and II
HIV I (ages 18+)(3)(5)   HIV I (ages 18+)(3)(5)
Toxoplasmosis (5)   Toxoplasmosis (5)
Vitamin D (OHD)   Vitamin D (OHD)
Total/normalized calcium   Total/normalized calcium
Selenium (5)   Selenium (5)
Thyroxine (T4)   Thyroxine (T4)
Thyroid-stimulating hormone   Thyroid-stimulating hormone
Antithyroglobulin antibodies   Antithyroglobulin antibodies
Antimicrosomal antibodies   Antimicrosomal antibodies
                                    FSH/LH (females aged 35-60   years)
                                    Insulin (6)
                                    C-peptide (6)
Biochemistry profile (5)   Biochemistry profile (5)
 Bicarbonate   Bicarbonate
 Blood urea nitrogen   Blood urea nitrogen
 Total bilirubin   Total bilirubin
 Alkaline phosphatase   Alkaline phosphatase
 Cholesterol   Cholesterol
 AST   AST
 ALT   ALT
 LDH   LDH
 GGT   GGT
 Total protein   Total protein
 Albumin   Albumin
 Creatinine   Creatinine
 Glucose   Glucose
 Calcium   Calcium
 Chloride   Chloride
 Uric acid   Uric acid
 Phosphorus   Phosphorus
 Sodium   Sodium
 Potassium   Potassium
 Triglycerides   Triglycerides
 Globulin   Globulin
 Iron   Iron
 Osmolality   Osmolality

Appendix 1. Blood and Urine Assessments by Specimen Type and Age Group
(continued)

                         AGE GROUP

12-19 years   20 years and older

                    Plasma

                             Glucose (examinees aged 20-39
                              years and 75 years and older)
                             OGTT (examinees aged 40-74
                              years)
                             Fibrinogen (examinees aged 40
                              years and older)(5)

                    Urine

Cadmium   Cadmium
Creatinine   Creatinine
Albumin   Albumin
Iodine   Iodine
Urine drug (ages 18   Urine drug (examinees aged 18
 years and over)(2)(3)   years and over)(2)(3)
 Cocaine   Cocaine
 Opiates   Opiates
 Phencyclidine   Phencyclidine
 Amphetamines   Amphetamines
 Marijuana   Marijuana
                                  Pregnancy test (females aged
                                   20-59 years)

                    White Cells

Storage/banking (5)   Storage/banking (5)

(1) Includes hematocrit, hemoglobin, red, white and platelet cell counts,
mean cell volume, mean cell hemoglobin, mean cell hemoglobin concentration,
red cell distribution width, platelet distribution width, mean platelet
volume, and 3-cell differential
(2) Phase 2 only
(3) Anonymous
(4) Phase 1 only
(5) Home examination also
(6) In phase 2, also from second venipuncture for examinees aged 40-74 years

Appendix 2. Laboratory Test Detection Limits

Some of the laboratory test detection limits have footnotes. These footnotes
appear at the end of the appendix.

Test   Detection limit

Albumin (urine)   0.5 ug/mL
Alpha carotene   0 ug/dL
Antimicrosomal antibody (AMA)   0.5 U/mL
Antithyroglobulin antibody (ATA)   1.0 U/mL
Beta carotene   0.67 ug/dL
Beta cryptoxanthin   0 ug/dL
C-peptide   0.03 pmol/mL
C-reactive protein   0.3 mg/dL
Cadmium (urine)   0.01 ng/mL
Cotinine   0.05 ng/mL
Creatinine (urine)   1 mg/dL
Erythrocyte protoporphyrin   2.5 ug/dL RBC
Ferritin   3 ng/mL
Folate (serum)   0.2 ng/mL
Follicle stimulating hormone (FSH)   0.15 IU/L
Glucose   2 mg/dL
Glycated hemoglobin   0 %
Helicobacter pylori   Qualitative tests
Hematology parameters
 Granulocyte   0 %
 Granulocyte (1)   0 number
 Hematocrit   0 %
 Hemoglobin   0 g/dL
 Lymphocyte   0 %
 Lymphocyte (1)   0 number
 Mean cell hemoglobin   0 pg
 Mean cell hemoglobin
  concentration   0 g/dL
 Monocyte   0 %
 Monocyte   (1)   0 number
 Platelet count (1)   0
 Platelet distribution width   0 %
 Red blood cell count (RBC) (1)   0
 Red blood cell distribution width   0 %
 White blood cell count (WBC) (1)   0
Hepatitis profile   Qualitative tests
Herpes   Qualitative tests
High density lipoprotein (HDL)   10 mg/dL
Homocysteine   0 umol/L
Human immunodeficiency virus (HIV)   Qualitative tests
Insulin   2.5 uU/mL
Iodine (urine)   0.2 ug/dL
Iron   3.0 ug/dL
Lead   1 ug/dL
Lipoprotein(a)   0 mg/dL
Lutein/zeaxanthin   0.43 ug/dL

Appendix 2. Laboratory Test Detection Limits (continued)

Test	Detection limit
Luteinizing hormone (LH)	0.15 IU/L
Lycopene	0.63 ug/dL
Normalized calcium	0.5 mmol/L
RBC folate	4.4 ng/mL
Retinyl esters	0 ug/dL
Rheumatoid factor	Qualitative tests
Rubella	0 IU
Selenium	8 ng/mL
Tetanus	0 U/mL
Thyroid stimulating hormone (TSH)	0.01 mU/mL
Thyroxine (T4)	1.0 ug/dL
Total iron binding capacity (TIBC)	9 ug/dL
Total cholesterol	10 mg/dL
Total calcium	1.5 mmol/L
Toxoplasmosis	0 IU
Triglycerides	10 mg/dL
Varicella	0
Vitamin B12	20 pg/mL
Vitamin E	20 ug/dL
Vitamin C	0 mg/dL
Vitamin A	0.5 ug/dL
Vitamin D	5.0 ng/mL

(1) Units for white blood cell count, red blood cell count, platelet count, lymphocyte number, granulocyte number, and mononuclear number are referenced in the Manual for Medical Technicians p. 5-1 (U.S. DHHS, 1996).

Note: Lower detection limits for analytes included in the general "biochemistry profile" are found in the Laboratory Procedures Used for NHANES III (U.S. DHHS, 1996).

Appendix 3. NHANES III SI Table

Some of the laboratory test in the SI table footnotes. These footnotes appear
at the end of the appendix.

Test (1)	NHANES Unit	NHANES Format	Conversion Factor	SI Unit	SI Format
Alanine aminotransferase(2)	N/A	N/A	N/A	U/L	XXX
Albumin (serum) (2)	g/dL	X.X	10	g/L	XX
Albumin (urine)	ug/mL	XXXXX.XX	N/A	N/A	N/A
Alkaline phosphatase (2)	N/A	N/A	N/A	U/L	XXX
Alpha carotene	ug/dL	XXX	0.01863	umol/L	X.XX
Antimicrosomal antibody	N/A	N/A	N/A	N/A	N/A
Antithyroglobulin antibody	N/A	N/A	N/A	N/A	N/A
Apolipoprotein AI	mg/dL	XXX	0.01	g/L	X.XX
Apolipoprotein B	mg/dL	XXX	0.01	g/L	X.XX
Aspartate amino- transferase (2)	N/A	N/A	N/A	U/L	XXX
Beta carotene	ug/dL	XXX	0.01863	umol/L	XX.XX
Beta cryptoxanthin	ug/dL	XXX	0.01809	umol/L	X.XX
Bicarbonate (2)	N/A	N/A	N/A	mmol/L	XX
Bilirubin (total)(2)	mg/dL	XX.X	17.1	umol/L	XXX.XX
Blood urea nitrogen (2)	mg/dL	XXX	0.357	mmol/L	XX.XX
C-peptide	pmol/mL	XX.XXX	1	nmol/L	XX.XXX
C-reactive protein	N/A	N/A	N/A	N/A	N/A
Cadmium (urine)	ng/mL	XX.XX	8.897	nmol/L	XXX.XX
Calcium (total)	N/A	N/A	N/A	mmol/L	X.XX
Calcium (normalized)	N/A	N/A	N/A	mmol/L	X.XX
Calcium (2)	mg/dL	XX.X	0.25	mmol/L	X.XXX
Chloride (2)	N/A	N/A	N/A	mmol/L	XXX.X
Cholesterol	mg/dL	XXX	0.02586	mmol/L	XX.XX
Cholesterol (HDL)	mg/dL	XXX	0.02586	mmol/L	X.XX
Cholesterol (LDL)	mg/dL	XXX	0.02586	mmol/L	X.XX
Cholesterol (2)	mg/dL	XXX	0.02586	mmol/L	XX.XXX
Cotinine	ng/mL	XXXX.XXX	N/A	N/A	N/A
Creatinine (2)	mg/dL	XX.X	88.4	umol/L	XXXX.X
Creatinine (urine)	mg/dL	XXX.X	0.0884	mmol/L	XX.X
Diphtheria	N/A	N/A	N/A	N/A	N/A
Ferritin	ng/mL	XXXX	1	ug/L	XXXX
Fibrinogen	mg/dL	XXX	0.01	g/L	X.XX
Folate	ng/mL	XXX.X	2.266	nmol/L	XXX.X
Folate (RBC)	ng/mL	XXXX	2.266	nmol/L	XXXX.X
Follicle-stimulating hormone	N/A	N/A	N/A	IU/L	XXX.X
GGT (2)	N/A	N/A	N/A	U/L	XXXX

Appendix 3. NHANES III SI Table

Test (1)	NHANES Unit	NHANES Format	Conversion Factor	SI Unit	SI Format
Globulin (2)	g/dL	X.X	10	g/L	XX
Glucose (2)	mg/dL	XXX	0.05551	mmol/L	XX.XX
Glucose (plasma)	mg/dL	XXX.X	0.05551	mmol/L	XX.XXX
Glycated hemoglobin	%	XX.X	N/A	N/A	N/A
Helicobacter pylori	N/A	N/A	N/A	N/A	N/A
Hematocrit	%	XX.XX	0.01	L/L=1	0.XXX
Hemoglobin	g/dL	XX.XX	10	g/L	XXX.X
Hepatitis A virus	N/A	N/A	N/A	N/A	N/A
Hepatitis B core antibody (anti-HBc)	N/A	N/A	N/A	N/A	N/A
Hepatitis B surface antigen (HbsAg)	N/A	N/A	N/A	N/A	N/A
Hepatitis C virus	N/A	N/A	N/A	N/A	N/A
Hepatitis D virus	N/A	N/A	N/A	N/A	N/A
Hepatitis B surface antibody (anti-HBs)	N/A	N/A	N/A	N/A	N/A
Herpes I & II	N/A	N/A	N/A	N/A	N/A
Homocysteine	N/A	N/A	N/A	umol/L	XX.X
Human immuno-deficiency virus	N/A	N/A	N/A	N/A	N/A
Insulin	uU/mL	XXX.XX	6.0	pmol/L	XXX.XX
Iodine (urine)	ug/dL	XXX.X	N/A	N/A	N/A
Iron	ug/dL	XXX	0.1791	umol/L	XX.XX
Iron (2)	ug/dL	XXX	0.1791	umol/L	XX.X
LDH (2)	N/A	N/A	N/A	U/L	XXX
Latex antibody	IU/mL	XXXX.XX	N/A	N/A	N/A
Lead	ug/dL	XX.X	0.04826	umol/L	X.XXX
Lipoprotein(a)	mg/dL	XXX	0.01	g/L	X.XX
Lutein/zeaxanthin	ug/dL	XXX	0.01758	umol/L	X.XX
Luteinizing hormone	N/A	N/A	N/A	IU/L	XX.X
Lycopene	ug/dL	XXX	0.01863	umol/L	X.XX
Mean cell hemoglobin	N/A	N/A	N/A	pg	XX.XX
Mean cell volume	N/A	N/A	N/A	fL	XXX.XX
Mean cell hemoglobin concentration	g/dL	XX.XX	10	g/L	XXX.X
Mean platelet volume	N/A	N/A	N/A	fL	XX.XX
Methylmalonic acid	ug/dL	N/A	0.085	umol/L	N/A

Appendix 3. NHANES III SI Table (continued)

Test (1)	NHANES Unit	NHANES Format	Conversion Factor	SI Unit	SI Format
Osmolality (2)	N/A	N/A	N/A	mmol/kg	XXX
Phosphorus (2)	mg/dL	XX.X	0.3229	mmol/L	X.XXX
Platelet count (3)	N/A	XXX.X	1	N/A	XXX.X
Potassium (2)	N/A	N/A	N/A	mmol/L	X.XX
Protein (total)(2)	g/dL	XX.X	10	g/L	XXX
Protoporphyrin	ug/dL	XXXX	0.0178	umol/L	XX.XX
Red blood cell distribution width	%	XX.XX	0.01	fraction	X.XXXX
Red blood cell count (3)	N/A	X.XX	1	N/A	X.XX
Retinyl esters	ug/dL	XXX	0.03491	umol/L	X.XX
Rheumatoid factor	N/A	N/A	N/A	N/A	N/A
Rubella	N/A	N/A	N/A	N/A	N/A
Selenium	ng/mL	XXX	0.0127	nmol/L	X.XX
Sodium (2)	N/A	N/A	N/A	mmol/L	XXX.X
Tetanus	U/mL	N/A	N/A	N/A	N/A
Thyroid stimulating hormone	uU/mL	XXX.XX	1	mU/L	XXX.XX
Thyroxine	ug/dL	XX.X	12.87	nmol/L	XXX.X
Total iron binding capacity	ug/dL	XXX	0.1791	umol/L	XXX.XX
Toxoplasmosis	N/A	N/A	N/A	N/A	N/A
Triglycerides	mg/dL	XXXX	0.01129	mmol/L	XX.XX
Triglycerides (2)	mg/dL	XXXX	0.01129	mmol/L	XX.XXX
Uric acid (2)	mg/dL	XX.X	59.48	umol/L	XXX.X
Varicella	N/A	N/A	N/A	N/A	N/A
Vitamin A	ug/dL	XXX	0.03491	umol/L	X.XX
Vitamin B12	pg/mL	XXXXX	0.7378	pmol/L	XXXXX.XX
Vitamin C	mg/dL	X.XX	56.78	mmol/L	XXX.XX
Vitamin D	ng/mL	XXX.X	2.496	nmol/L	XXX.X
Vitamin E	ug/dL	XXXX	0.02322	umol/L	XXX.XX
White blood cell count (3)	N/A	XX.XX	1	N/A	XX.XX

(1) Results are based on a serum sample unless otherwise noted.
(2) Biochemistry profile
(3) Units for white blood cell count, red blood cell count, platelet count, lymphocyte number, granulocyte number, and mononuclear number are referenced in the Manual for Medical Technicians p. 5-1 (U.S. DHHS, 1996).

```
Appendix 4.  Laboratories and Diagnostic Centers

Component                         Laboratory or Diagnostic Center
-----------------------------------------------------------------------

Cotinine                          National Center for Environmental Health,
Vitamin D                         CDC,
                                  Atlanta, GA


Homocysteine                      Tufts University School of Medicine,
                                  Boston, MA


Thyroxine                         White Sands Research Center,
Thyroid stimulating hormone       Alamogordo, NM


Antimicrosomal antibody           Endocrine Services Laboratory,
Anti-thyroglobulin antibody       University of Southern California,
                                  Los Angeles, CA


Helicobacter pylori               Vanderbilt University,
                                  Nashville, TN
```

References

Albers JJ, Marcovina SM. Standardization of apolipoprotein B and A1 measurements. Clin Chem 35:1357-61. 1989.

Bachorik PS, Lovejoy K, Carroll MD, Johnson CL, Albers JL, Marcovina SM. Measurement of apolipoprotein A1 and B during the Health and Nutrition Examination Survey (NHANES III). Clin Chem 40(110):1915-1920. 1994.

Bull BS, Rittenbach JD. A proposed reference hematocrit derived from multiple MCHC determinations via haemoglobin measurements. Clin Lab Haematol 12 (suppl 1):43-53. 1990.

Lewis SA, Hardison NW, Veillon C. Comparison of isotope dilution mass spectrometry and graphite furnace atomic absorption spectrometry with Zeeman background correction for determination of plasma selenium. Analytical Chemistry 58:1272-82. 1986.

Marcovina SM, Albers JJ, Dati F, Ledue TB, Richie RF. International Federation of Clinical Chemistry standardization project for measurements of apolipoprotein a1 and b. Clin Chem 37:1676-82. 1991.

National Center for Health Statistics. Plan and operation of the Third National Health and Nutrition Examination Survey, 1988-94. Vital Health Stat 1(32). Hyattsville, Md.: NCHS. 1994.

National Committee for Clinical Laboratory Standards. Procedure for determining packed cell volume by the microhematocrit method -- second edition: approved standard. NCCLS document H7-32. Wayne, PA: NCCLS. 1993.

U.S. Department of Health and Human Services (DHHS). National Center for Health Statistics. NHANES III reference manuals and reports (CD-ROM). Hyattsville, Md.: Centers for Disease Control and Prevention, 1996. Available from National Technical Information Service (NTIS), Springfield, Va. (Acrobat .PDF format; includes access software: Adobe Systems Inc. Acrobat Reader 2.1).

World Health Organization. Diabetes Mellitus: Report of a WHO study group, WHO Technical Report Series 727. Geneva, Switzerland: WHO. 1995.